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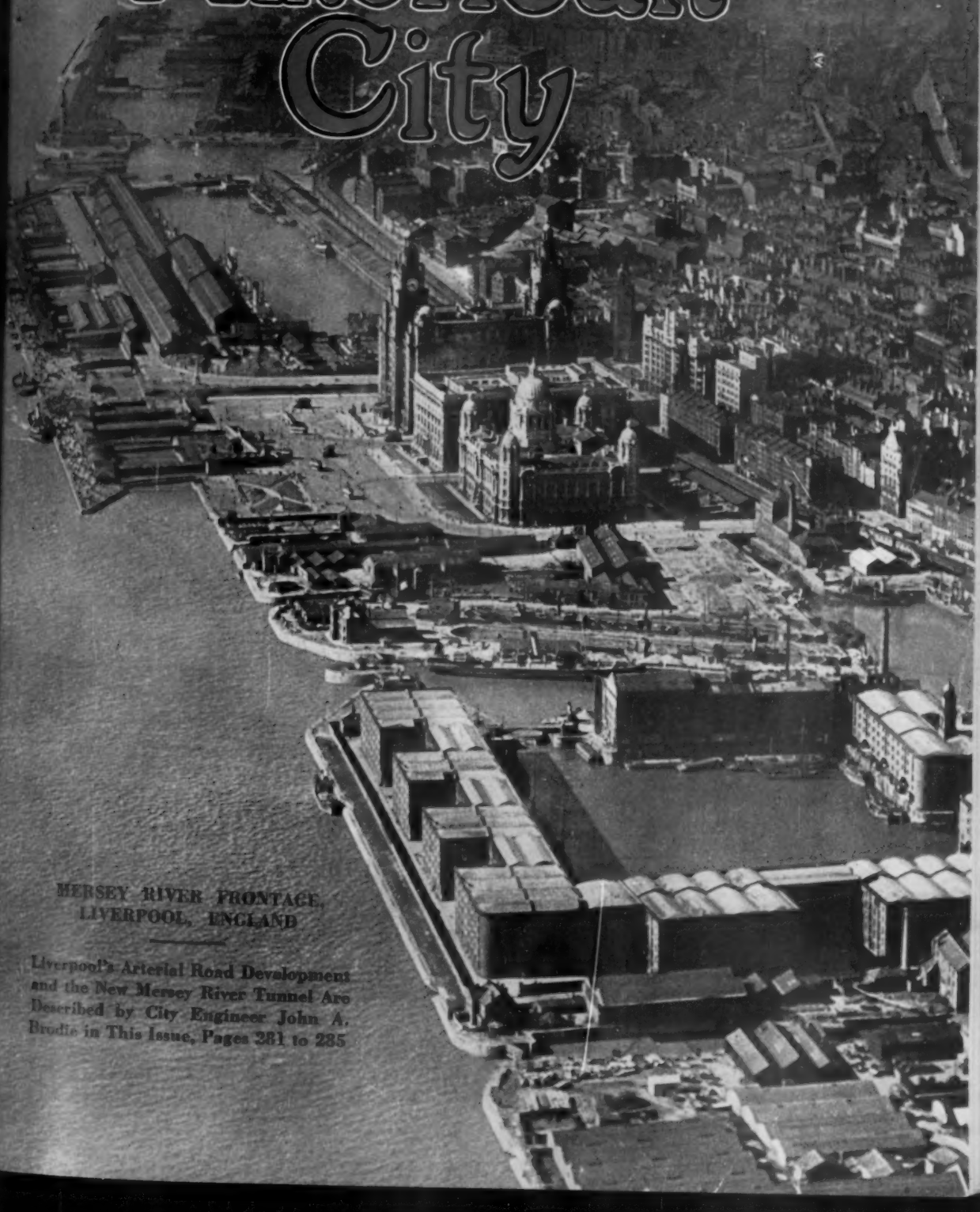
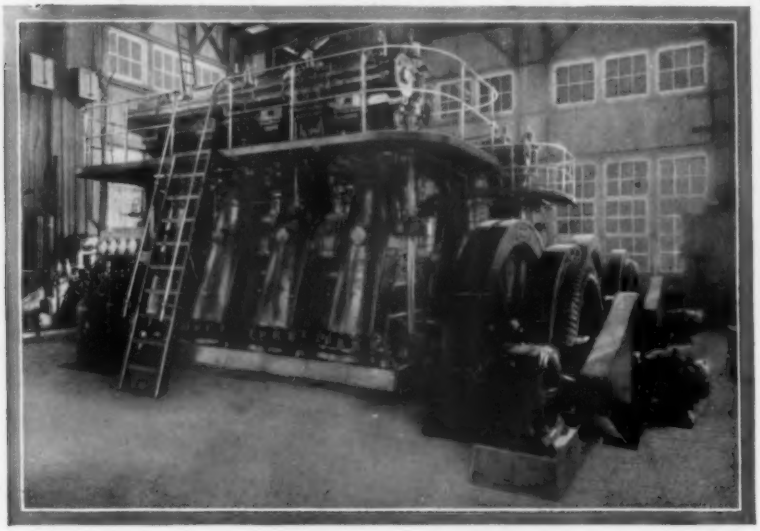


MERSEY RIVER FRONTAGE, LIVERPOOL, ENGLAND

Liverpool's Arterial Road Development and the New Mersey River Tunnel Are Described by City Engineer John A. Brodie in This Issue, Pages 281 to 285

FULTON DIESEL



Two 485-B.H.P. Fulton-Diesel Engines.
Fernandina, Fla., Municipal Plant.

Fulton-Diesels Reduce Fuel Cost 80 Per Cent

These FULTON-DIESELS installed in the Fernandina, Fla., light, water and ice plant completed their first year's operation on Sept. 4th, 1925. The city was served without any interruption during the entire period.

City Manager E. C. Garvin and City Auditor H. P. Livingston are the authorities for the following figures:

Fuel oil used during last 12 months' operation of steam plant	$36,641.72
Fuel oil used during first 12 months' operation of Fulton-Diesel plant	7,635.19
Saving	$29,006.53

Total maintenance replacement costs on the Fulton-Diesel engines for the year amounted to $130.00.

Central stations and public utility companies are finding the Diesel Engine the ideal prime mover. In an increasing number of stations, Diesels are being installed to replace steam units. Since the Diesel eliminates stand-by charges, peak load and emergency service is available at a cost far below that of other types of generating equipment.

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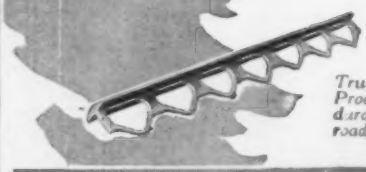
Vol. XXXIV — INDEX TO CONTENTS, MARCH, 1926 — No. 3

Bill-Boards
Important Decision in New York State.... 239
Five Ways of Regulating Bill-Boards.... 329
Boston's First Honorary Mayor..... 262
Building Codes—Unreasonable Provisions.. 321
Camden Asks Its Namesakes to Convene... 316
Chamber of Commerce Activities..... 308
City and Regional Planning and Zoning
Zoning Where the Courts Are Unfavorable 237
Regional Planning and Suburban Federations 257
Arterial Road Development in Liverpool.. 281
State and Local Campaign for Zoning.... 311
Zoning Notes 323
City Engineer's Observations in Europe.... 286
City Managers and the Merit System..... 319
Civic Effort and Activity Coordinated..... 309
Civil Service
The Personnel Problem in the Public Service 261
Clean-up Campaigns
A New Crusader for Cleaner Cities..... 307
An All-Year Clean-up Campaign..... 311
Conferences, Conventions and Exhibitions... 329
Düsseldorf Exhibition 243
League of South Carolina Municipalities.. 264
International Conference on Housing and Town Planning 268
Conference of Swimming Pool Operators.. 307
Daylight Saving in Northeastern U. S...... 305
Kansas City's System to Be Revamped.... 308
Finance
A City of 15,000 Self-Supporting..... 310
Increased Assessed Valuation Urged, Joliet 310
The Municipal Bond Market..... 324
Fire Prevention and Control
Where Ice Allied Itself with Fire..... 260
All-Year Fire Prevention Campaign..... 308
Reduction in Insurance Rates, Laconia.... 309
Deposit Earns Lower Insurance Rates.... 317
Recommendations for Improvements, Hometown 318
Compression Type Fire-Hydrants..... 339
Prize Contest for Fire..... 345
Forestry
Plant a Tree 278
Systematic Tree Planting in Cities..... 300
Powerful Sprayer for City Use..... 351
Forward Steps in Municipal Affairs..... 316
Grade-Crossing Safety Signal..... 317
Health and Sanitation
Law That Provides for Community Nurses 285
Sickness Costs $2,000,000,000 a Year.... 290
Movement for County and District Hospitals 298
Hospitals for Rural Communities..... 299
Small County Employs Six Nurses..... 306
First American Health Congress..... 311
Highways
Theory of Design of Concrete Pavements.. 245
Bituminous Pavements 247
Land Values Increased by Paving Streets. 269
France Investigates Paving 275
Trucks for Extra-Heavy Duty..... 339
A Street Excavator and Loader..... 345
Landing Fields—London Makes a Mistake!.. 263
Legal Decisions 321
Lighting
Floodlighting Capitol Dome, Austin, Texas 253
Street Lighting in South Bend, Ind..... 291
Street Lighting in New York City..... 295
Units and Standards, Davis Island, Tampa 343
Minnesota Has 10,737 Local Governments.. 306
Motor Equipment 293
News and Illustrations..... 331
Parks
To Keep Parks Free from Rubbish..... 251
Development of Trenton's Park System.. 312
Administration of a Water-Front Park.... 322
Wheel-Type Power Lawn-Mower..... 341
A Safe Power Mower..... 351
Power-Plants
Diesel Engines for Power-Plants..... 240
Publications 325
Recreation
Open-Air Theater 256
Night Lighting for Outdoor Sports..... 265
Growing Games 297
Salaries of Councilmen, Mayors, etc...... 288
School Sites 285
Sewers
Stream Pollution and Extent of Sewage Treatment 254
Rates on Trickling Filters..... 270
Sioux City Puts Ugly Creek Under Cover. 276
Signs
Steel Posts for Highway Signs..... 343
Snow Removal
Costs Cut 56 Per Cent..... 250
One-Man Grader Cleans Up Snow..... 335
Traffic
Four Lanes Help to Speed Up Traffic.... 290
A Fee to Park on Boston's Streets?.... 307
A 'Through Street' Can Become a Menace 313
Cards and Posters Reduce Jaywalking.... 316
Early English Laws for Highway Safety.. 320
Permanent Traffic Marking for Pavements. 331
Automatic Traffic Regulators..... 333
Unit Flasher for Traffic Signals..... 335
Selective Control for Traffic Signals..... 349
University of Baltimore to Teach Municipal Administration 306
Voting Machines 337
Waste Collection and Disposal
Types of Waste Collection Equipment.... 244
Horse Still a Factor in Collection..... 337
Destructor Under Construction in Buffalo. 351
Water-Supply and Water-Works
Tastes and Odors in Water-Supplies.... 252
Water-Works Improvements, Litchfield, Ill. 272
Cross-Connections Prohibited 274
A Water-Supply That Grows with the Town 279
Cross Lake Reservoir at Shreveport..... 294

See also Municipal and Civic Publications, page 325

The offices of THE AMERICAN CITY, 443 Fourth Avenue, New York, are headquarters for the free distribution of information on equipment for municipal work. If you want catalogs, prices or names of manufacturers, let us help you.



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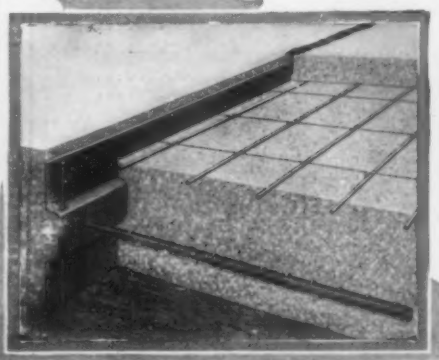

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Zoning: What Can Be Done for It Where the Courts Are Unfavorable?

By Bertram H. Saunders

WHEN community growth was slow and open spaces were all about, and neighborhood opinion was of some effect, the sins that now are commited in the name of so-called progress and development against the welfare, order, and health of our towns, were not possible to any alarming degree. In those times industry was rarely in danger of being cramped for growing room, few streets were overcrowded, and the enterprise of neighbors was not often close enough to affect the individual unless something very unusual was afoot.

But to-day in our cities population rises like a flood. Gambling in real estate grows to enormous proportions and overshadows the operations of the conservative broker. More and more the land is owned by men who will not own it to-morrow; by men whose only interest in land is to crowd every available foot of it with whatever structures will yield the highest and quickest profit; by men who make commerce of neighborhood amenities, and who care nothing for the detrimental community effects of their activities. So what was once merely an occasional mild nuisance has become a dire injustice and a mounting menace to welfare.

In States Whose Courts Have Upheld the Zoning Principle

there are many municipalities which have not yet taken advantage of this modern device for controlling their future development in the public interest.

In States Where the Courts Are Unfavorable to Zoning

—of which New Jersey is an outstanding example—there is need either for new laws or constitutional amendments, or for a campaign of education which will bring to the judges a realization of present-day problems affecting the public welfare in urban communities.

In both groups of states, the accompanying address, delivered before the Annual Meeting of the New Jersey State League of Municipalities last month by the Chairman of the North Jersey Transit Commission, will be of interest and value.

Home districts are blighted by business, garage, and factory invasion long before natural development requires it. Home owners are driven out and the value of handsome houses is destroyed overnight. So, a fine street becomes a teeming hive where the poor are crowded into these once fine houses, cheaply changed into makeshift, and often unsanitary, quarters. Districts so created are the problem of the health and police authorities and the welfare agencies of many cities.

Again, where those who prefer gardens, lawns, trees, and sunlight about their houses have developed this desirable environment, massive apartments intrude and shut out the sky. In poorer districts, the butcher shop, the vegetable store, the small abattoir, the garage, and the noisy factory, push in among the buildings where workers have to live. On narrow down-town streets, totally inadequate to serve

the great populations of large structures or to accommodate their wheeled traffic, great office buildings are erected. By street congestion so induced or added to, vehicular movement is slowed, and the normal per diem service of expensive trucks and delivery cars, and of the men who operate them, is curtailed. There results a sharp rise in the cost of conducting industry and the carrying-on of retail business, which inevitably is reflected in the living costs of the community.

Let a city be never so far-sighted in the planning of its water, sewer, fire, police, and other services, if the inclination of an individual is to build a multi-family house or other out-of-place building where no such development was looked for nor in reason ought to be, the underground piping systems must be extensively rebuilt, the fire and police organizations expanded, and the burden of the expense borne, not by the man who causes it, but by all the taxpayers.

Under such unenlightened expansion, no result is possible but extreme disorder with all its evil effects upon the comfort, wealth, health and general welfare. How shall we handle the vexed traffic problems of the city? How cope with the mounting cost of doing business? How provide intelligently for legitimate expansion? How improve the scandalous conditions existing in urban passenger transportation? How conserve the physical interests of industries that are the backbone of our communities? And last, but most important, how protect the living quarters of the people from invasions that degrade neighborhoods, that entail discomfort and ill health and debase American living standards?

The answer seems plain. This is the day of the engineer. Society more and more turns to him in the perplexities of its congestion. He brings the blessings of water, light, heat, and good drainage to our homes. He devises our transportation; in whatever field he works he brings order out of chaos, and renders enterprise more comfortable, more profitable, and more intelligent. In increasing measure he is giving his attention to the ignorance and chaos so much in evidence in the muddled growth of our cities, and if city planning ever was a mere "city beautiful" idea, it is so no longer. The untoward conditions which these whirlwind times have swept in upon us call for a practical remedy, and by patient observation and intelligent deduction, the engineer has devised a science of community planning which aims at health, comfort and economy in town development.

These principles applied conserve realty values, stop the tremendous waste in structures forced into obsolescence before their time, provide a corrective for most of the ills of unregulated expansion, protect home districts in the enjoyment of those reasonable neighborhood amenities which are essential to the welfare of children and to the health and comfort of persons of all ages. And all this is done without injustice to any property owner.

But the Courts of New Jersey have barred the city planning engineer from our state, for what community plan is possible of achievement if the community is denied the right to regulate the height, bulk, and use of structures? Of what use, for instance, is a well-considered scheme of major and minor thoroughfares when any property owner may so build as to impose upon a narrow street a traffic burden it was never designed for? Without the right to zone, we are as a people without hope. No matter how we suffer or how we plan, or how we aspire, our finest visions are vain when our Courts rule that in our city building we may not even be intelligent. By these decisions, people who have founded a new community to escape the intolerable conditions of living forced upon them by lack of regulation in communities they have left, cannot preserve the new amenities they have been at such pains to create.

Our judges are men of understanding and culture. It is impossible that they disapprove of decent house surroundings or order in community layout. Therefore, when they withdraw the sanction of law from zoning measures, it is reasonable to infer that they believe desired protection is obtainable by private initiative.

Any of us who over a period has dealt with the cases that come before a board of adjustment knows how vain is that reliance, and that without authoritative regulation no enduring protection is possible. The well-to-do, if chance favors them, may for a period bar hurtful structures and uses from their vicinity, but the people of small incomes and the poor are left entirely undefended. Either the Courts must concede the right to zone, or our housing conditions must keep on going lower. Who, equably, can contemplate that process?

It is the habit of those most interested in zoning to respect our Courts but how can we be patient when they set up a rule which declares that the man who destroys community amenities and injures his neighbor's property and forces down our standards of living is

entitled to the protection of law, and that his neighbors who are grievously hurt have no rights for the Court to consider. It stings our sense of justice that law which was created to enable us to live together, law which is supposed to be codified common sense, law which was meant to perpetuate the principles set up by the founders of our state, is made to serve the selfish desires of individuals and damage the best interests of a whole community.

The same judges who restrain the police power from regulating the size and uses of structures have not hesitated to approve the police power control of the details of building construction, of the sanitary systems of building and provisions for safeguarding their occupants from accident; and this probably because they are familiar with many instances proving the need of such control. The conclusion, then, is inescapable that they are not familiar with the innumerable instances proclaiming the dire need of extending the police power as implied in zoning. For when the Courts of Massachusetts, New York, Connecticut, Pennsylvania, California, Illinois, and other states, with the same basic law as ours, uphold the principle, and when able New Jersey lawyers contend that there is no real obstacle in the fundamental law, the layman must believe that what is responsible for the present situation is not the law itself, but lack of vital touch with present necessity on the part of those who control the application of it. For, every distressing condition I have outlined is within the observation or experience of most of us, or can be amply supported by concrete instances.

The question asked is: What are we to do about it? What do we do about any fundamental human wrong? If our vision is clear, our blood red, and our determination unwavering, we keep at the matter until it is settled right. No American state is going to be kept permanently inferior to its neighboring states. There should be a state-wide association of good citizens, working all the time to establish zoning, and not to be disbanded until the zoning principle is firmly ensconced in law, with those other enlightened measures that have enabled society to move forward.

An Important Bill-Board Decision in New York State

A VERY important advance in the state of New York in handling bill-boards is reported in *The New York Law Journal* of December 25, 1925, which records a decision of the police court in the village of Kings Point, Nassau County, by Judge Hugh Knowlton.

It appears that the village of Kings Point had prohibited bill-boards within the village, which is of an exclusive residential character, with the exception of signs relating to the sale of the property on which they were erected, which signs were limited to 4 x 4 feet as major dimensions.

The bill-board men put up a 10 x 12 advertising sign, in violation of the ordinance, and the village took issue with them. Judge Knowlton, in a long and well-written opinion, decided first that the ordinance was valid and constitutional and did not constitute an illegal deprivation to property without due process of law; second, that the deprivation of such a property right is justified under the police power of the state, since the restraint imposed is warranted by the public interest; and, third, that such an ordinance may be justified under the police power by reason of esthetic considerations "which justify the exclusion of advertising bill-boards and signs detrimental to property values and to the comfort and well-being of the neighborhood."

In the comment it is stated that "while such an ordinance would be illegal and unconstitutional, since unreasonable, if directed to a business section of Manhattan, it is reasonable and constitutional in an exclusive residential village of a non-business and non-commercial character."

In an editorial on this decision, *The New York Law Journal* says:

"It seems to us that esthetic regulations which are reasonable and fair in the light of the particular circumstances of the case may be upheld under the broad and comprehensive police power. Several able courts have so held. As stated by Professor Freund in his work on 'The Police Power,' if offensive odors and noises may be limited and restrained, why not similar protection be furnished 'to the eye' of a particular community in the interest of the general welfare and the maintenance of a high and meritorious community standard?"

Of interest in this connection is the recent statement of the General Outdoor Advertising Company, Inc., of New York:

"1. Structures should not be located in purely residential districts or in locations where the resentment of reasonably minded persons would be justified; in locations that obstruct the view of natural beauty-spots; on trees, rocks, fences, posts, or natural objects; on locations that would tend to endanger traffic.

"2. Structures shall not be erected except on property owned or leased for that purpose, and in no instance within the confines of the public highway."

Such a statement of principles by the foremost concern in this field is an excellent indication of the fact that the bill-board interests are beginning to see the light of a new day.

J. HORACE MCFARLAND.

A Study of Diesel Engines for Municipal Power-Plants

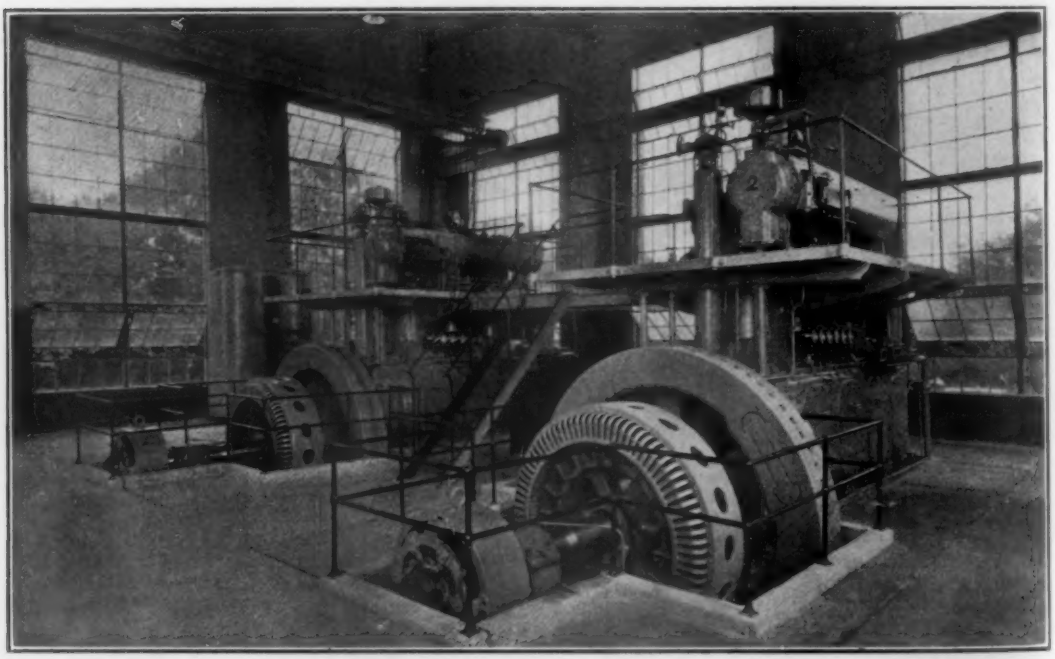
By Arthur L. Mullergren
Consulting Engineer, Kansas City, Mo.

THE diesel engine has the highest thermal efficiency of any type of prime mover on the market to-day. This was proved more than twenty-five years ago, but it has taken practically all of this time to bring the engine to a point where it is considered sufficiently reliable and safe for use in water-works and electric power-plants. This type of engine is now available in practically all commercial sizes up to 3,000 h.p. It is now recognized by most engineers and operators as being thoroughly reliable, requiring comparatively small maintenance and up-keep, and is extremely economical in fuel requirements under variable load conditions.

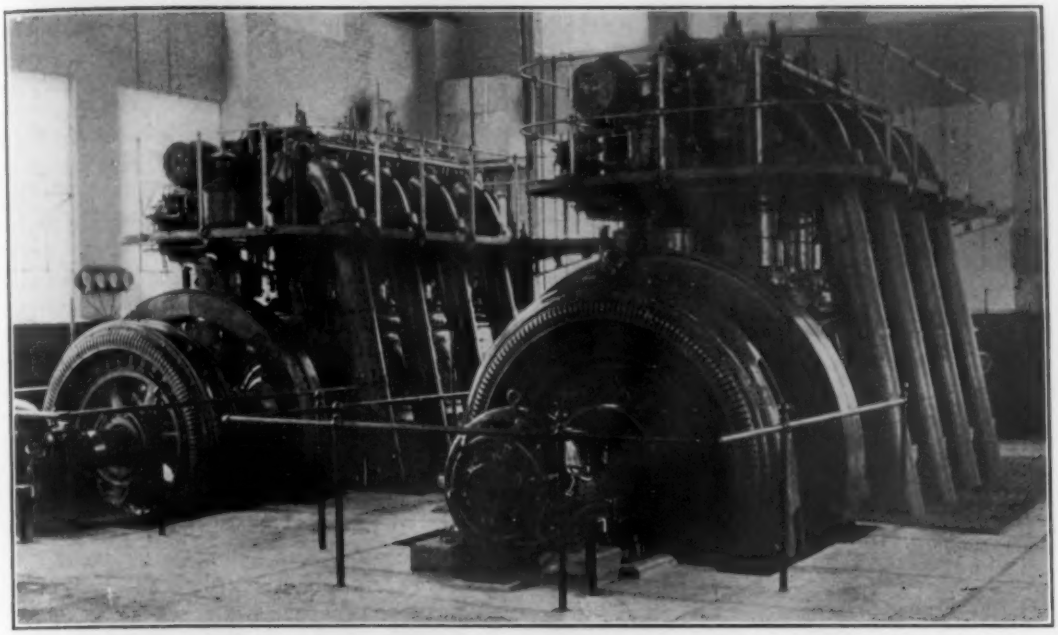
During the past ten years it has been successfully demonstrated that the diesel oil engine has a field of usefulness in water-works and electric power-plants. This does not mean that this type of prime mover should be applied in every instance, but it is felt that in the smaller water-works and power-plants it is well to consider these engines and make a comparative set-up of over-all annual charges of the diesel engine versus those of a steam plant.

During the past several years the writer has had occasion to work out the economics of the diesel versus the steam plant for quite a number of small electric-power plants and water-works stations, and in quite a number of instances the final answer was surprising. It is often said that the diesel unit cannot compete with a steam plant in a territory where the fuel costs are low, owing to the very high fixed charges of the diesel plant. Below is cited one instance of a comparison of the total annual costs of a diesel and a steam plant located very near the coal fields, in order to show how closely these total charges on the two types of plants compare. The figures are based on actual conditions and refer to a 1,500-kw. electric power station serving a commercial lighting and power business and also operating under the same roof the water-works pumps by means of electric motor drive.

The comparative costs are computed on the following data:



INTERIOR VIEW OF MUNICIPAL LIGHT PLANT, FREDONIA, KANS., SHOWING TWO 300-HORSE-POWER WORTHINGTON DIESEL OIL ENGINES



INTERIOR OF MUNICIPAL LIGHT PLANT, DUNCAN, OKLA., SHOWING TWO 500-HORSE-POWER BUSCH-SULZER DIESEL OIL ENGINES

Coal ...11,000 B.T.U. $4.00 per ton delivered in storage
Oil .....18,000 B.T.U. 5c per gal. " " "
Boiler efficiency 72%
Turbine economy ..... 17 lbs. steam per kw. hr.
Diesel engine economy .... .7 lb. oil per kw. hr.
Fixed charges:
Interest 5%
Depreciation 5%
Maintenance and insurance..... 3½%

The comparative costs were computed on a 60 per cent and a 40 per cent load factor, with the following results:

	Costs per Kw. Hr. Plant Production Costs	Fixed Charges	Total Costs
At 60% load factor:			
Diesel engine plant.....	$ .75	$1.00	$1.75
Steam turbine plant.....	1.07	.68	1.75
At 40% load factor:			
Diesel engine plant.....	.88	1.42	2.30
Steam turbine plant.....	1.34	.94	2.28

Each plant consisted of two 750-kw. generating units with all accessories, and a brick building suitable for a third unit.

From the foregoing it can be seen that with a higher load factor the diesel engine's total annual costs are equal to those of the steam turbine. But at the lower factor, the steam turbine showed a slight saving, which might be considered negligible. It should also be mentioned that the diesel plant cost $100,000 more than the steam turbine plant.

Similar analyses have been prepared for various municipalities in different sections of the country for plants having as low a capacity as 300 h.p., and in sections where the fuel costs varied widely from the foregoing fuel costs, and in the majority of these instances the diesel plant showed an over-all annual saving, even though its initial cost was higher than that of the steam plant. On the other hand, there have been installations where the loads were similar in which the steam plant showed a saving. Therefore, it does not necessarily follow that in all instances the diesel plant is the more economical.

Selection of Type of Plant

The following factors largely influence the determination of the type of plant to select:

1. The size of plant
2. The cost of fuel
3. The load factor of the plant
4. Water and railroad facilities at the site

Size of Plant.—If the plant is a large one, it might be impracticable to install diesel engines, owing to the large number of units that would be involved. In this respect consideration should be given to the ultimate as well as the present load conditions, as with a growing community the capacity of the electric power station may be increased beyond the feasible capacity of a diesel plant.

While diesel engines are being manufactured up to 3,000 h.p. and in a few instances manufacturers have developed a 5,000-h.p. unit, it is felt that the practicability, reliability, and economics of these extremely large diesel engines have not been sufficiently deter-

mined at this time to justify their installation in water-works or electric power stations where an entire community depends upon the service. While it is expected that within the next ten years these larger-size units will be developed satisfactorily, there are a great many mechanical features to be worked out before this is accomplished. It is therefore felt that at the present time it is wise to plan initial plants with a view to installing these extremely large units at a later date.

The steam turbine has been developed to a very satisfactory degree, in a wide range of capacities, sizes up to 70,000 kw., and consequently there need be no fear of the limit of the size of the steam plant.

Cost of Fuel.—The second factor named above is of course one of the main factors in computing the total annual costs. Owing to the high thermal efficiency of the diesel engine, which at present is around 33 per cent, the fuel cost per brake horse-power is one of the smallest costs of the total annual charges. The diesel fuel economy does not vary widely with the widely fluctuating load, as does a steam turbine. From one-half to full load, the fuel economy of the diesel plant does not vary more than 20 per cent. On the other hand, in the steam plant, the fuel cost is the principal item of production expense, and if the plant is located very close to the coal mine and the coal costs are extremely low, the steam plant will, in the majority of instances, show a better economy than the diesel plant.

The Load Factor.—Owing to the higher fixed charges of a diesel plant, it is able to show better over-all economy with a higher load factor, and consequently this third factor, in a great many instances, largely determines the selection of the type of plant. By reference to the comparative set-up of the diesel and the steam plant shown above, it is to be noted that at a 60 per cent load factor the annual costs of the two types of plants are the same, while at a 40 per cent load factor, the steam turbine shows a slight saving. At a 30 per cent load factor in this same plant, the steam plant would show a decided saving over the diesel plant, while at a 70 per cent load factor the diesel plant would show a decided saving. In small water-works plants a more or less constant load can be maintained by the use of large storage reservoirs. As an offset to this, however, there would be a smaller number of hours of operation, which would bring the plant load factor down to a possibly low figure, which would result in a poor showing in the annual cost of a diesel plant. Furthermore, in a small water-works, adequate reserve equipment must be maintained, and in addition, fire pumping equipment of much larger size than the service pumping equipment must be installed in order to comply with the Underwriters' requirements. The fixed charges on this additional equipment, which lies idle a great portion of the time, results in a higher total annual charge per million gallons pumped than would be the case with the steam plant maintaining the same capacity of equipment. It would then be a question of whether or not the smaller operating expenses of the diesel plant would offset its higher fixed charges.

It is extremely doubtful whether or not a direct diesel-engine-driven water-works station properly equipped and complying in all respects with the Underwriters' requirements would be a more economical installation than a steam plant. However, by a combination of electric power and water-works equipment motorized, and auxiliary gasoline-engine-driven fire-pumps installed, it is felt that this installation would be a more economical layout than a steam station in sizes up to 2,000 h.p. This is due to the fact that a much higher load factor of the total plant would be obtained, as the water-works pumping could be taken care of during the off-peak electric load, resulting in a smaller investment and its attendant fixed charges.

Water and Railroad Facilities at the Site.—The fourth factor named above, that is, the water and railroad facilities at the proposed site, has an important bearing on the steam plant, but it is not so vital to the diesel plant. Adequate condensing water must be available, and suitable railroad facilities are necessary for the economical handling of coal. The diesel plant need not be located on a railroad nor on any large water-supply, as the fuel oil can be piped from the nearest railroad at a comparatively small expense, and cooling water for the diesel engines can be obtained by means of cooling towers or spray ponds. I have checked up instances where all other factors were favorable for the steam plant; but as a suitable site could not be obtained, it was necessary to install a diesel engine plant.

Fixed Charges

In the computation of the fixed charges on diesel plants, I have found that a fair charge covering several makes of engines in different installations is as follows:

Depreciation	5%
Maintenance	2½%
Insurance	1%
Interest	5% to 7%

The depreciation rate would be equivalent to a 20-year life of the unit on the straight-line basis. There are some diesels in use today that have been in successful operation for twenty years, and it is felt that a good diesel will have a life of from fifteen to twenty years. The 5 per cent depreciation fund would earn an amount that would retire the investment in fifteen years, so such a figure is considered fair. The maintenance item of 2½ per cent will cover all repairs and maintenance during the life of the engine. The interest rate will vary according to the cost of money to the user. Some municipalities are able to sell their securities on a 5 per cent basis, others have to pay more, while sometimes the funds are obtained by commercial loans at a higher cost. This item is easily determined for each particular case. The cost of insurance on such a plant is about 1 per cent of the investment.

In this discussion I am referring entirely to the diesel engine and have not considered the so-called semi-diesels or surface-ignition type internal-combustion engines.

There are more than a half a dozen reliable makes of diesel engines on the market, whose manufacturers specialize in this type of engine and who maintain a competent and adequate engineering staff for development and research work. These manufacturers are constantly in touch with their installations and make periodic inspections of them, so that the users are assured of efficient and reliable results.

Adaptation of Different Types

Diesel engines are now commercially built in the following types: 4-cycle air injection; 2-cycle solid injection. The 4-cycle engines are in the larger sizes and are more complicated than the 2-cycle engines, the larger sizes justifying the additional refinements. The 2-cycle engine is used in the smaller sizes, owing to its simplicity.

The air injection engine is somewhat more complicated than the solid injection, but, with the present development, handles the fuel oil more satisfactorily.

The solid injection engines have more or less been confined to the smaller-size units, largely on account of their simplicity. Undoubtedly in time the solid injection engine in large capacities will be developed to a satisfactory degree. Both of the types are manufactured by several well-known diesel engine builders, and it is merely a matter of choice of engine, depending largely on the size desired. The two-cycle engines cost about $65 per h.p., and the four-cycle about $80 per h.p.

Direct-connected Pumps

The matter of direct-connecting or gearing diesel engines to water-works pumps has been discussed considerably, and there are quite a large number of such installations in satisfactory use. Suitable gears of the enclosed herring-bone type have been in use for a great many years in steam turbine work, and their economy is excellent. They are commercially developed in ratios as high as 1 to 5. Belt-driven units are not particularly recommended, owing to the floor space required, unsatisfactory operation, inefficiency, and unreliability. The speed of diesel engines can be adjusted for variable load conditions of the pump, and a geared or direct-connected engine-operated pump would ordinarily show a much higher over-all efficiency than a pump driven by means of an electric motor operated from a diesel engine electric generating unit. The latter is more flexible and reliable, however, and saves in annual charges, as well as first cost, owing to the use of a smaller number of larger-size engines, which can be used to drive several pumps. Furthermore, this type of installation allows the use of different types and sizes of pumps, motor-driven, as all can be operated from one or two diesel units.

The diesel engines are a practicable, economical, and reliable source of power for medium- and small-size water-works and power-plants, and where the conditions justify their installation the owners need have no hesitancy in installing them.

Exhibition at Dusseldorf of Hygiene, Social Welfare and Athletics

THE year 1926 is for Düsseldorf-on-Rhine the year of the great Exhibition of Hygiene, Social Welfare and Athletics, which is definitely a part of the work of reconstruction. The Governments of the German Republic and of the individual states, the Austrian Federal Government, the German Museum for Hygiene at Dresden, and many commercial and industrial organizations are at work completing the exhibits. The 8th of May is the date of opening.

In all the sections the problems and achievements of mankind will be portrayed—suffering and healing, searching and finding, fighting and conquering. The relation of man to all that the natural world has to offer him; to what science has taught him; to what social life has developed, will be shown. This involves homes, clothing, food, climate, hygiene, sanitation, physical training, sports, education, thrift, art, and literature—the whole range of man's struggles and accomplishments. Further information may be obtained by addressing the Director of the Exhibition, Düsseldorf.

Types of Waste Collection Equipment

By W. J. Galligan

Assistant Superintendent of Streets, Chicago, Ill.

THERE is, perhaps, no kind of municipal equipment that offers a wider variety of types than that used by the different cities for the collection of household waste. Like the methods employed in the final disposition of the waste itself, the style of equipment in use for collecting and hauling seems to have received little study and scant attention. Apparently, each city has been content with its own particular type, making little effort to improve it.

In 1905, when the city of Chicago entered into a contract for the disposal of its garbage by the reduction method, it became necessary to separate garbage from household refuse, and a type of garbage wagon was adopted consisting of the ordinary wagon running-gear with a steel, water-tight box of 4 cubic yards capacity, with six steel sectional covers, the theory being the concealment of five-sixths of the load during the loading operation. These tanks can be removed from the wagon bed at the reduction plant or loading stations and empty ones substituted. This same type of wagon is still in use, the equipment being owned by the city.

Chicago's ashes and miscellaneous waste have been hauled for many years in wooden wagons of a special design, of 5 cubic yards capacity. Of late years, 5-ton trucks of 8 cubic yards capacity have been employed also. The wagons are the property of the individual owners, as are the trucks. Wagons with a driver receive $11 per day, and trucks receive $27.50.

The motorization of Chicago's refuse collection equipment was begun in 1923. During the preceding years, the inadequacy of the city's method of collection in dilapidated wagons, the excessive cost of refuse removal by hired trucks, the increasing distance to dumps, and the advancing cost of operation led the City Council and Street Bureau officials to seek an improved system. They investigated the use of the tractor and trailer system in other cities and were convinced that this would give saisfactory service at less expense. They therefore made appropriation for partial installation of this system. As these vehicles were for an entirely different activity from that of those previously used, the Council departed from its established policy of standardization and authorized the purchase of one 5-ton truck from each of eight different companies, the prices ranging from $4,400 to $6,200 each. In this way the city was afforded opportunity for experimenting and deciding which truck was adapted for its needs. Likewise, in the selection of trailers, seven types were chosen. In fact, all trailer manufacturers were invited to submit their wares.

Since the installation of the trial trailers purchased during the summer of 1923, foremen of dumps, superintendents of collection and equipment, engineers and officials of the Bureau, have made careful investigation of their operation and efficiency as contrasted with the old method of team and motor-truck haul. Reports from all are favorable to the tractor and trailer system. Their investigations have convinced them that two types of trailers are adapted to Chicago's needs. In accord with this finding, 160 trailers of the two makes selected were purchased at a cost of $248,865.

As no appropriation was made for the purchase of tractor trucks and the city was hiring trucks at the rate of $32.50 per day, a truck company proposed furnishing them on a rental plan, and that when an amount equal to the cost price of the truck had been paid, the equipment would become the property of the city of Chicago.

The plan was accepted, and twenty-five tractor trucks were placed in service in August, 1924, to be paid for on the deferred payment plan of $400 per month for each truck; payments to be continued until $6,100 per truck was reached.

The initial installation of the tractor and trailer system was made in fourteen of the fifty wards into which the city is divided. Four of the wards were selected because their respective ash and refuse teams were able to make but one load a day, the dumps available for disposal being from eight to nine miles distant. This made the cost of collection almost prohibitive. In the case of two wards chosen for experimental purposes on short hauls, the distances to their respective dumps were three and five miles.

There are in the six wards eight tractor and trailer units, one tractor and three trailers in

active operation, forming a unit or train. To each unit there are three, and in certain wards six, trailers in reserve in order that collection may not be interrupted while the tractor and train are in transition.

The tractor-trailer trains make from five to six trips on the 3-mile haul, four trips on the 5-mile, and three on the 8- or 9-mile haul, traveling in the last instance a total mileage of from 48 to 54 miles daily. The tractor picks up the trailers from their collection districts or from a central point to which the trailers have been brought for that purpose. Where conditions permit, the tractor hauls the trailers into the dump, but where this is impossible by reason of a bog-like condition, "caterpillars" bring them in. The tractors are manned by a driver and a helper and operated in specific districts. Three to five loads are collected daily. The trailers have a water-level capacity of 4½ cubic yards. The loads are heaped and receive a credit of 6 cubic yards at the dump. The engineers state that they carry more nearly 7 than 6 cubic yards.

Using the test of the past year with eight tractors and eighty-one trailers as a basis, the city officials and engineers estimate that 142 tractors and 1,020 trailers are needed to cover the area within the city limits. The cost of these vehicles is placed at $2,342,000. Supplementing them, the city would still employ 452 teams to collect from the unimproved alleys of the city. With that equipment a large saving would be effected.

Last year the collection of ashes and refuse cost $2,570,190 and the hauling of garbage, $638,123—a total of $3,208,313. It is estimated that the same service in quantity but considerably better in character could have been rendered by the tractors and trailers for $2,490,810, thereby effecting a saving of $717,503. From this estimated annual saving of $717,503 alone, all the tractors and trailers required could be paid for in about three years.

ACKNOWLEDGMENT.—From a paper read before the American Society for Municipal Improvements, at Des Moines, Iowa.

Theory of Design of Concrete Pavements

By Clifford Older

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IT is needless to say that there are many unsolved problems relating to paving design, no matter what type of pavement is being considered. Special problems are also encountered in the design of street paving that do not necessarily apply to rural highway work. This discussion deals only with some of the questions that arise in planning concrete pavements for cities. A street pavement should primarily afford adequate traffic service at reasonable cost, considering maintenance and renewal expense, and, hardly less important, it should present a sightly appearance.

Traffic Service Costs

In order to afford adequate traffic service at a reasonable cost, the pavement must be so designed as to afford a surface of low tractive resistance. Professor T. R. Agg has shown that tractive resistance increases materially with surface roughness. This surface should therefore be made as smooth as may be accomplished without disproportionate addition to construction costs. Vehicle operators may be more sensitive to the discomfort incident to ordinary surface roughness than to the added operating cost chargeable to roughness. Nevertheless, the roughness operating cost burden may easily assume such large proportions as alone to justify much care in construction operation. A degree of roughness less than that probably necessary to cause destructive impact effects may materially increase tractive resistance and therefore the operating costs of the road or street.

By the exercise of special care in finishing a concrete street pavement, although it may be otherwise constructed by methods in common use, it has proved feasible to secure a surface that does not vary more than ¼-inch as determined by a 10-foot straight edge placed parallel to the grade line. A more perfect surface would be desirable, but is not easily obtained by present methods of construction. There is little excuse for penalizing traffic by a lesser degree of smoothness.

The most conspicuous element of traffic surface cost is the desirability of the pavement itself, for the reason that although a pavement of comparatively high tractive resistance may, unknown to the road user, levy a heavy toll, yet a failure of the pavement due to a defect of design or construction is open to the eyes of all and leads to serious complaint. The elements entering into the making of good concrete have been discussed many times.

Proper Pavement Thickness

Investigations of the Bureau of Public Roads indicate that at least as great stresses may occur along pavement edges as at corners. The Bates road test and common observation, however, indicate that structural failure of such character as to impair traffic service, materially increase maintenance costs, and shorten its useful life, predominantly occurs at corners when the edge and corner thickness is the same. The stress at a right-angled corner due to any given load "P" may be calculated with reasonable safety by the formula $f = \frac{3P}{t^2}$ (derived from the common beam formula) and if a safe working stress is assumed for "f," the edge or corner thickness may be determined by the formula $t = \sqrt{\frac{3P}{f}}$ This is the thickness formula recommended by the Committee on Proposed Specifications for Portland Cement Concrete Pavements of the American Society for Municipal Improvements.

Theoretical considerations and studies of test results indicate that the pavement thickness at a distance of more than 2 feet from an edge may be made equal to 0.7 t. This is based on the assumption that two or more adjacent corners formed in the interior portion of a pavement by intersecting cracks or joints will be so interlocked by means provided in the design as to mutually support any load applied to either corner. This end may be accomplished by means of sufficient closely spaced steel reinforcement to prevent any cracks that may form because of subgrade movement or other cause, from widening due to the joints' becoming filled with ice or dirt as it alternately widens and closes because of contraction and expansion of the slab. If sufficient steel is used for this purpose, mutual support of the adjacent corners and edges formed by such cracks as may be unavoidable is assured not only by the sheer strength of the steel, but even more certainly by the interlocked roughness of the surfaces formed by the fracture. The danger of structural failure at interior corners is thus greatly minimized. As this would seem to be a most important function of pavement reinforcement, it appears logical that the minimum amount of steel used should at least be sufficient to resist the stresses set up by contraction of the pavement and be proportioned in the manner recommended by the committee mentioned above.

In order to promote economy by reducing the variety of mesh designs called for, and in other ways it would seem logical to make transverse joint spacings equal to the width of the pavement, so that the area of steel called for in each direction would be the same. By so doing, only a few styles and weights of fabric reinforcement, which would be determined by the width of the street and thickness of the pavement, would be necessary.

Integral curbs add to the edge strength of a street pavement. Doweling combined curb and gutter construction to the pavement increases the edge strength of the pavement and prevents the settlement of the combined curb and gutter.

Traffic Facilities

In street work it would seem wise to provide 10 feet of width for each lane to be kept open for the passage of vehicles, and at least 6 feet additional for each strip to be allowed for parallel parking. The minimum curb radius at street corners should not be less than the turning radius of the longest ordinary vehicle, which is about 15 feet, and preferably greater on narrow streets to improve sight distance and avoid cramped intersections.

Pedestrian traffic should not be penalized by water-filled gutters at sidewalk crossings. This may be avoided by decreasing the fall from crown to curb as sidewalk crossings are approached, and placing a small inlet midway between the sidewalk extension and each corner of the intersection. The gutter dip to such inlet from a point opposite the center of the walks need be but a few inches and should be made by reverse vertical curves. The gutter grade to the inlet away from the intersection should also be made by easy reverse curves.

Appearance

While the very nature and purpose of pavements does not permit much in the way of beautification, certain unsightly features, at least, may be avoided. Among these may be mentioned square-cornered curb cross-sections, short-radius curves at intersections, choppy curb grades and poor curb alignment, blotchy surface finish due to spot troweling without subsequent general surface belting, irregular alignment of expansion joints or other dividing planes, unsightly irregular contraction cracks caused by dividing planes too widely spaced or the lack of sufficient steel, unsightly inlet designs, poorly graded parkways, etc.

ACKNOWLEDGMENT.—From a paper presented before the Des Moines Convention of the American Society for Municipal Improvements.

Developments in the Design and Construction of Bituminous Pavements

By Hugh W. Skidmore
Chicago Paving Laboratory, Chicago, Ill.

THE new method of designing mixtures for asphalt pavements that has rapidly developed during the past five years has as quickly passed the theory period as it has come into usage. It is based primarily upon one fundamental, that is, denseness. Density does not necessarily mean very much unless it is defined. A mixture may be dense and yet very unstable. Two other very important factors enter into the problem of designing a mixture capable of withstanding the distorting effect of traffic; these are the voidage of the mineral aggregate, and the plasticity of the final mixture.

Plasticity is a direct function of voids in relation to bitumen content. The higher the percentage of voids in the aggregate the greater the plasticity of the mixture, provided sufficient bitumen is added to approximately fill those voids. It will readily be seen, then, that plasticity is likewise a direct function of the thickness of the film of bitumen coating the particles of aggregate.

If, then, the problem of producing greater stability of mixture resided alone in the reduction of film thickness, stability could be controlled at will in any mixture by simply reducing or increasing the amount of asphalt. That this would be dangerous practice, however, is immediately apparent because, unless reduction in the cementing medium is accompanied by a reduction of voids in the aggregate, the mixture is immediately weakened in structure, and likewise because of increased porosity is weakened in its natural resistance to the attack of moisture. Hence, if structural soundness is to be preserved, the voids must be reduced before the bitumen is reduced. Strange as it may seem, the more both are reduced, the stronger the mixture becomes, provided two things are also done. First, the bitumen must be maintained at such a percentage as will almost fill the voids (or will fill them at, say, 350°F.) and the mixture must be capable of compression to within, say, 98 per cent of maximum density.

How Can Voids Be Reduced?

The first consideration in the reduction of voids is the grading of the mineral aggregate, and the second is the filler to be added. Aggregates of high voidage will naturally require more filler to reach minimum voids than will be necessary with an aggregate of low voidage; likewise, lower ultimate voids in the "filler-aggregate" combination will result in the case of the low voidage initial aggregate.

Revert for a moment to the old standards of mixture design. Richardson's ideal heavy-traffic sand grading for sheet asphalt was the well-known:

Passing—	Per Cent
80-mesh	34
40-mesh	43
10-mesh	23
	100

The voids in this combination vary only slightly according to the aggregate, say, between 30 and 32 per cent. His ideal mixture for heavy traffic was:

	Per Cent
Bitumen	10.5
Passing—	
200-mesh	13.0
80-mesh	26.0
40-mesh	33.0
10-mesh	17.5

The addition of this amount of filler reduced the voids from 30.7 per cent in the raw sand to say, 25 per cent in the combined aggregate (the exact voidage would depend upon the filler used, but 25 per cent is approximately correct for minimum voids possible with ordinary filler). At 77°F this mixture will require 11.6 per cent bitumen to fill the voids. Under the requirements of modern practice such a mixture would be classified as quite plastic. With its correct amount of bitumen of, say, 11.5 per cent it would be quite mobile under the rollers during construction. Its resistance to shear (the distorting force of traffic) is low compared with modern mixtures.

On the other hand, Platte River sands, which are productive of low voids, may be combined in such manner as to produce in combination with 20 per cent of limestone filler, voidage at least as low as 12.5 per cent, which in the mixture would mean only 5.4 per cent bitumen to

completely fill the voids. This mixture is far from plastic; in fact, it is so resistant to compression that under a load of 12,000 pounds per square inch the highest density obtainable was only 93 per cent of the theoretical maximum, whereas, with more plastic mixtures 100 per cent maximum density was readily obtained with only one-half this load. The grading of the mineral aggregate in this mixture was:

Passing—	Per Cent
200-mesh	21.4
80-mesh	12.1
40-mesh	19.6
10-mesh	46.9

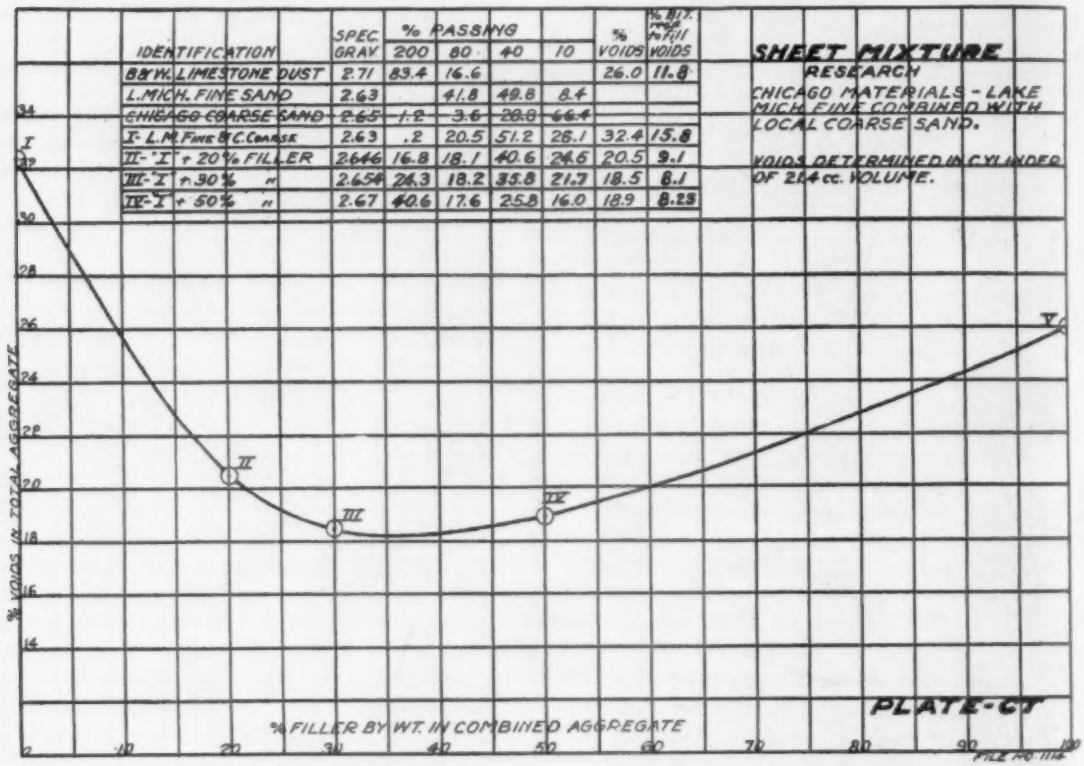
Its resistance to compression was unquestionably due to the low percentage of material between the 200- and 10-mesh sieves. Such mixtures are of value from the scientific standpoint only, under present methods of laying, since they are too resistant to compression to be practical.

These two extremes show that the plasticity or workability of the mixture is an important factor and must be considered in designing. Improved methods of laying will steadily decrease the degree of mobility required during construction. Traffic requirements of to-day are demanding increasingly resistant mixtures, and these requirements are being readily satisfied in every instance where special study is being given the problem.

Designing a Mixture

In order to briefly describe the procedure of designing a mixture from a known premise rather than by the old trial and error method, Plate CT is introduced. This shows in tabular and graphical form the study of local materials in combination, enables the designer to quickly select the best combination of sand and filler, and establishes without argument the maximum amount of bitumen permissible, by determining all the mixture can possibly hold at air temperature with the mixture compressed to maximum density.

Lake Michigan fine sand that is available for asphalt work is not ideally graded. It is relatively high in material passing the 80-mesh and retained on the 200-mesh sieve, and is quite high in material passing the 40 and retained on the 80, with very little material retained on the 40 and practically none passing the 200. For many years it has been the general custom among most of the contractors laying asphalt pavements in and around Chicago, to use this sand without admixing a coarser material to raise the 10-mesh fraction. This practice is not considered good, as excellent coarse sand is readily available and can be mixed with the regular run lake sand so that a low-voidage aggregate will result. Without the addition of coarse material, the voids in


IDENTIFICATION
SPEC GRAV
% PASSING 200
80
40
10
% VOIDS
% BIT. REQ'D TO FILL VOIDS
B&W. LIMESTONE DUST 2.71 83.4 16.6 26.0 11.8
L.MICH. FINE SAND 2.63 41.8 49.8 8.4
CHICAGO COARSE SAND 2.65 1.2 3.6 28.8 66.4
I- L.M. FINE & C. COARSE 2.63 .2 20.5 51.2 28.1 32.4 15.8
II- "I" + 20% FILLER 2.646 16.8 18.1 40.6 24.6 20.5 9.1
III- "I" + 30% " 2.658 24.3 18.2 35.8 21.7 18.5 8.1
IV- "I" + 50% " 2.67 40.6 17.6 25.8 16.0 18.9 8.25
SHEET MIXTURE RESEARCH
CHICAGO MATERIALS - LAKE MICH. FINE COMBINED WITH LOCAL COARSE SAND.
VOIDS DETERMINED IN CYLINDER OF 214 cc. VOLUME.
% VOIDS IN TOTAL AGGREGATE
% FILLER BY WT. IN COMBINED AGGREGATE
PLATE-CT
FILE NO. 1116

the lake sand frequently run as high as 35 to 37 per cent, and this may be easily reduced to about 30 per cent.

The initial sand shown in the curve is a mixture of local coarse or torpedo and lake sand, showing 32.4 per cent voids. By the addition of 30 per cent of limestone filler, the voids are reduced to 18.5 per cent. (Thirty per cent filler in this aggregate would mean approximately 27 per cent of raw filler in terms of the whole mixture.) Numerous pavements have been laid this season in Chicago carrying 25 per cent of raw filler. Such mixtures are easily handled and laid as long as the bitumen is kept down where it belongs, but if it is raised only a fraction of a per cent (in terms of the mixture) the mixture stiffens up so that it is difficult to handle.

With these dense, high-filler mixtures, temperatures must be kept up so that the material will retain sufficient heat during the laying operations. This means that the mixture should reach the street with a temperature between 325 degrees and 400 degrees F. It must be spread and rolled as quickly as possible, and initial compression must be effected by means of heavy rollers. The three-wheeled type of roller is much to be preferred for the initial rolling. The mixture must be deposited far enough away from its final position to insure turning. Raking must be thorough and deep. Long-toothed rakes or forks for rapid combing ahead of the regular rakers have proved very satisfactory. All fine-mixture asphalt pavements should be luted just behind the rakers.

Asphalt Concrete Mixtures

The same methods of design that are described here with respect to sheet asphalt mixtures are equally applicable to asphaltic concrete and stone-filled sheet mixtures. In order to show how accurately mixtures of this character may be designed, two instances during the present season are recalled when pavements for especial traffic conditions were so designed and, upon determining the formula to be used, it was found that as little as 3 or 4 pounds more of bitumen in a 2,000-pound box affected the mixture on the street. One of these projects was a short length of Jackson Boulevard between Canal and Clinton Streets, adjacent to the new Chicago Union Station. As might be expected, this pavement was designed for very dense, heavy traffic. A typical analysis of the top mixture is:

	Per Cent
Bitumen	6.0
Passing—	
200-mesh	12.3
80-mesh	8.4
40-mesh	11.9
10-mesh	10.0
4-mesh	*33.7
2-mesh	*11.3
¾-inch-mesh	*6.4

* Stone 50 per cent.

This pavement was laid upon closed binder. Three 10-ton rollers, one of which was of the three-wheeled type, were used in laying the pavement. The coarse aggregate was Wisconsin granite, and the filler local limestone dust 90 per cent of which passed a 200-mesh sieve.

Research

Quite a number of investigators have been, and still are, giving considerable time to research work with asphalt paving mixtures. Some of these workers have proceeded along the line of search for fundamental principles, while others have sought to develop empirical tests that will rate mixtures as to stability, and still others have combined the two. Such tests will fall short of the real answer if they neglect basic knowledge of the mechanics of the mixture. Nevertheless, any serious work of this nature is not to be discouraged, since at least it must lead to a better understanding of the problem. A curious thing about most of the tests so far made public is the fact that the authors stress shear strength as the most important factor, yet some of the tests described either fail to develop shear, or combine shear with so many other forces that the results are difficult of interpretation or wholly misleading.

Compressive strength of a mixture is of no particular importance after the pavement is laid. Tensile strength and, more especially, shear strength, are highly important, since the traffic forces which develop distortion place the mixture structure in tension and in shear. Tests that will correctly measure these stresses direct and free of compression, viscosity, and friction against mold forms, will certainly give us much more definite knowledge of our product than tests which develop intricately combined stresses. In the investigation work which has been in progress in our own laboratory for the past few years, we have used both tensile and shear tests, measuring only these forces. Some very interesting data along these lines are still in the process of making.

One of the most interesting investigations that have been recently reported is by Captain S. B. Moore, and Father F. A. Tondorf, Seismologist of Georgetown University, in *The Military Engineer* for March and April, 1925. This work measured the intensity of vibration in surfaced and unsurfaced portland cement

concrete slabs under moving loads. It is to be hoped that these investigations will be given wider application.

Some facts are so self-evident that they require no investigation to demonstrate them. For example, it is useless to attempt to stabilize mixtures by the use of a bitumen, a few points lower in penetration than is common practice. About the only material effect this will have on the mixture is to increase its stiffness somewhat during the laying operations. Such distortion as does occasionally appear in asphalt pavements, occurs during hot weather and is due primarily to an excess of bitumen; the consistency of the bitumen has almost nothing to do with this phenomenon. Tests which endeavor to measure resistance of mixture to distortion must then deal with summer pavement temperatures, say 140 degrees to 150 degrees F. There will be no need to waste time investigating mixtures which contain more bitumen than they have room for at this temperature, as they are immediately doomed to failure. Tests dealing with old standard mixtures are of no value unless the scope of the investigation is extended to include later practice so that a comparison of values may be made.

Asphalt pavements, as a general proposition, are by no means a failure. Such failures as do occur now and then represent only a minute fraction of the total yardage of pavement. But it is the failures rather than the successes that quickly and repeatedly come to our notice. There is a continuous race between traffic and pavement design, so that we must be always on the alert for improving our design, and before we can do this intelligently, we must have a thorough understanding of the fundamentals. Therefore, these various investigators should be given all the encouragement possible so that we may be able to reduce asphalt mixture design to the exact science that it really is.

ACKNOWLEDGMENT.—From a paper read before the American Society for Municipal Improvements, at Des Moines, Iowa.

Snow-Removal Costs Cut 56 Per Cent

By Joseph J. Comfrey
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IN Boston our street-cleaning force is ready to start cleaning away snow at any time of the day or night. As soon as two inches of snow has fallen the plows start right out on the main streets, piling the snow into windrows. The Barber-Greene loader, which was purchased for the winter season of 1923-24, and the trucks come up behind the plows and pick up the windrows. From the main business district the snow is hauled about one-half mile and dumped, the loader ordinarily keeps about nine trucks busy.

The loading machine is equipped with a side loader mounted on a trailer so that the trucks can be driven alongside of the machine for loading. It is equipped with a large scoop which feeds the snow onto the conveyor belt. Being mounted on a crawler-type tractor, the machine moves ahead against considerable resistance at speeds ranging from 30 to 130 feet per minute.

Removal Costs Reduced 56 Per Cent

The trucks are fitted up with very high sideboards so that they can carry from 8 to 10 cubic yards of snow on each load. The loader is used with all grades of light and heavy snows and fills a truck in from 45 to 90 seconds. This is very fast loading, which results in the most efficient use of the trucks possible.

The cost of snow removal has been reduced about 56 per cent through the use of the loader, as shown in the following tabulation:

COST OF OPERATION OF LOADER WITH TRAILER FOR SIDE DISCHARGE	
Depreciation—$7,800.00 ÷ 4 years	$1,950.00
Average interest at 6% — $\frac{5}{4}$ x $\frac{\$7,800 \times .06}{2}$	292.50
Maintenance and repair allowance	350.00
Total annual fixed charges	$2,592.50
Average fixed charges per day operating $2,592.50 ÷ 18 days	144.03
Gasoline and oil, average	3.50
Labor—4 men x $6.60	26.40
Total cost of operation per day (12 hours)	$ 173.93

Even if conservatively spread over an average of 18 days of use per year, the fixed cost amounts to but $144.03 per day operated. Adding to this the cost of gasoline and oil and the wages of four men, gives a total daily cost of operation for the loader of $173.93 for 10 hours. The loader usually runs from six o'clock in the evening to six in the morning with two hours for changes in shifts. The nine trucks for this work cost the city about $252. Adding this truck cost to the cost of operation of the loader itself and the cost of

two additional men to move automobiles out of the way and to help in other work, gives a total daily cost of $430.13 for snow removal. The average cost per cubic yard is 18 cents. Previously the loading of the snow from the windrows into the trucks was all done by hand. This was much slower, held up each truck considerably while being loaded, made it necessary to employ a larger number of men and trucks, made the cost of snow removal much greater, and did not get the work done nearly as satisfactorily. With this method it required at least 10 minutes to load a truck using a minimum of 10 men.

Even then the trucks could be loaded with only 5 to 6 cubic yards of snow. Larger loads were impractical because of the difficulty of throwing the snow over the very high sideboards. The time required for loading cut down the number of trips made by the trucks to two or less per hour. We used a total of at least 20 trucks then and it was necessary to be loading at least nine trucks at a time in order to keep them moving. This required a gang of about 90 men for shoveling.

The total cost of this work, including labor and trucks, amounted to about $1,010 per 10 hours' work. This was two and a half times the present cost of doing the work with the loader. The actual saving in cost which has been obtained is $570.87 per 10-hour run. The average saving per year on the conservative basis of 18 10-hour days of use amounts to $10,275.66.

This saving repays the entire cost of the loader in less than 14 days' operation and shows how little it has to be used to pay for itself in one season. During a really severe winter the loader will save enough to pay for itself a good many times over, so that from a cost standpoint alone, we would not think of being without it.

Loader Expedites Work

In addition to these savings, the work is handled much more satisfactorily with the loader than by the old method. It used to be difficult to get enough men and trucks on short notice to work after midnight in order to get the work done at all, whereas the loader is ready to go at any time in any temperature and for as long as necessary, and it is easy to get the few men and comparatively few trucks required to do the work. Now we can be sure of getting the snow removed and there has not been any storm yet which has not been easily handled with the loader. The loader picks up the snow and leaves the street just as clean as hand shoveling does. We have no trouble in using the loader on any of Boston's narrow and crooked streets. When the street is too narrow for side loading, the side loader is disconnected and trucks are loaded by backing along behind the loader. The loader is easy to operate and can be used in these streets very satisfactorily.

During the first winter the loader was used about twenty times and was operated a total of about 30 days. Except for a few very minor replacements, we have not had to do a thing in the way of repairs on this piece of snow-handling equipment.

Five Thousand Dollars for a Plan to Keep Parks Free from Rubbish

ANNOUNCEMENT is made by The Philadelphia Commission of an award of $5,000 to be given to the resident or organization of Philadelphia or its suburbs submitting the best practical plan by which the public can be educated and restrained from depositing or leaving rubbish of any kind in Fairmount Park and in the other public parks or squares of the city of Philadelphia.

The Philadelphia Commission is organized to promote and enhance, in cooperation with the Mayor and Council of the city of Philadelphia and the Fairmount Park Commission, the beautification of the metropolitan area of Philadelphia. Its President is Samuel Rea, former President of the Pennsylvania Railroad. Senator George Wharton Pepper, James M. Beck, and Edward W. Bok are Vice-Presidents, Clarence Gardner Secretary.

In announcing the $5,000 prize offer, the Commission says: "The growing habit of leaving rubbish of all kinds in Fairmount Park and in the other parks and squares of the city is causing more and more unfavorable comment from the citizens and the visitors to Philadelphia. Particularly after holidays and warm periods, the condition of Fairmount Park with its litter of newspapers, milk-bottles, orange-peels, and picnic rubbish of all sorts is a disgrace to the city of Philadelphia. It has now been decided to put this question squarely up to the people of Philadelphia to say how this constant reflection on the untidiness of the people can be remedied. They are asked to suggest their own plan, which will do away with this distinct blot upon the city life."

The description of the plan must not exceed 500 words and must be received by March 15, 1926. An announcement, giving additional details, may be secured from The Philadelphia Commission at 1320 Packard Building, Philadelphia.

Tastes and Odors in Water-Supplies

What Means of Protection Are You Using Against This and Other More Dangerous Pollution?

By George A. Johnson
Consulting Sanitary Engineer, New York City

THE writer has some very pronounced convictions respecting the responsibilities of water-works superintendents, even in such small matters—often erroneously so considered—as the prevention of tastes and odors in water-supplies due to microscopic organisms.

Offensive tastes and odors in water, caused by the development of certain forms of microscopic life on the watershed, particularly in reservoirs, lakes, ponds and the streams that feed them, depreciate the value of that water in numerous ways. A citizen who pays his water-rents punctually has every good reason to expect that he will receive for his money pure water, clean water, and water which is free from those characteristics which cause the consumer to suspect that someone has been dangling a string of overdue fish in it, or that it has passed through a barnyard or cucumber patch on its way to his spigot.

Tastes and odors in water may not be primarily prejudicial to health, but they indicate that somebody in charge of the water department has fallen asleep at the switch. This being so, and if such things as the causes of the bad tastes and odors have not been located and eliminated, the consumer may well suspect that other and worse defects in the supply may exist for the same reason. A public water-supply must always be like the spouse of Gaius Julius Caesar or a white dress tie.

One can perhaps forgive a water-works superintendent for one batch of tastes and odors, but where such things crop out year after year, at about the same time, of about the same kind and of about the same degree of unpleasantness, then the superintendent is, or rightfully should be, subject to inquiry respecting the manner in which he is conducting his job. It may then be found, as it often is, that the superintendent has tried to eliminate the causes of the undesirable tastes and odors in the supply, and that he has appealed to his superiors for ways and means whereby he can always forestall the annual recurrence of this nuisance. Sometimes he has let the matter rest, becoming convinced that the people will complacently accept the inevitable when it comes, just as they have spring fever and baseballitis, and take sulphur and molasses at certain seasons of the year.

If a superintendent is on to his job, and if his department has the necessary funds for the purpose, he will carry on his staff a competent biologist whose duty it will be to keep a running census of the biological flora and fauna of the water-supply. Then, when certain objectionable forms occur in steadily increasing numbers, he knows that those growths must be stopped at once, or specific trouble will soon follow from tastes and odors in the water.

It is presumed that suitable vigilance is always exercised in keeping streams, ponds, and reservoirs free from rank growths of vegetable life, particularly of those weeds which secrete essential oils of an offensive character. This being done, the uninterrupted log of the biologist will always discover abnormal development of objectionable microscopic life. Then is the time to apply the corrective chemical where it will do the most good. The biologist is available to see that it is done right, and all is well.

It seems to the writer that there should be no excuse for offensive tastes and odors due to microscopic growths appearing and persisting in a public water-supply at any time. If the biologist is on the job, and the proper corrective measures are taken in time, such undesirable conditions need not occur.

The New York incident of the winter of 1922 may be one of the rare exceptions. Probably it falls within the class of permissible but nevertheless unfortunate experiences. At the time we heard all about it from W. W. Brush, and Dr. Frank E. Hale. We know that two snappier water-works officials would be hard to locate anywhere; but General Synura won a decisive action over them on that occasion, and chiefly, it is thought, because they did not believe he would, or could, develop a strong offensive in the winter time. He had attacked before on numerous occasions and had been defeated with relative ease. This time, however, in the dead of the winter, he unexpectedly mobilized an unusually active, though small, force, moved swiftly on the works at Ashokan and Kensico, and put over a victory that cloyed

the palates of a good share of the citizens of Manhattan, and that left behind a fragrant memory that will not soon be forgotten.

We cannot help but feel that the experience of 1922 taught a desirable lesson. We believe that the officials of the department, and the water-works fraternity at large, have profited by it; but will the measure of that profit be restricted to forestalling the activities of taste- and odor-producing organisms? If Synura can put one over on as competent a water department as that of New York, it is not without the bounds of speculative reasoning that other equally unlooked-for things may happen to the water-supply; and that they may have far more serious consequences. The watershed is populated. People will become ill when they least expect it. The watershed patrol is admittedly efficient, but it cannot be perfect. Sterilization of the water-supply cannot do everything. A watershed as clean as human ingenuity can make it, and being kept so by diligent patrol, constitutes a great measure of protection. Sterilization of the supply is an added safeguard, and a very potent one, but filtration we have not, although plans for such works have for many years been gathering dust among the archives of the water department. In the experience of 1922 we had our warning of what the low forms of microscopic life can do, and the unexpected ways in which they sometimes perform. Shall we delay the construction of a filter plant for New York until after that dark day when we shall receive another lesson fraught with far more disastrous consequences? Be assured that the scene is always set for it, the potentialities are ever present, and we are as yet unprepared.

City Pays for Floodlighting of Capitol Dome

THE STATE CAPITOL OF AUSTIN, TEXAS, AFTER THE DOME WAS ILLUMINATED WITH FLOODLIGHTING PROJECTORS

On a clear night the Capitol dome can be seen for a distance of 50 miles, as it is illuminated by more than 100 floodlights. This lighting, which includes the dome alone, is effected by the use of batteries of G. E. floodlights on the roof of the building. The installation consists of 96 Type L-9 and 15 Type L-3 floodlights, 3 18-inch searchlights and 20 reflectors. The Type L-9 floodlights are installed in 8 batteries of from 8 to 16 lights per battery. The Type L-3 floodlights are placed inside the balconies to keep the columns from throwing shadows on the walls of the dome. A reflector is placed inside each of the 20 windows of the dome and inside each reflector is a 500-watt lamp. Amber is used, as it has a tendency to bring out the architectural features of the building. Approximately 70 kilowatts of current are used. The installation was paid for by the city of Austin, and the operating expenses are defrayed by the state. The installation, designed by the illuminating engineers of the General Electric Company, is the largest in the state

Relation Between Stream Pollution and Extent of Sewage Treatment Required

By J. K. Hoskins

Sanitary Engineer, U. S. Public Health Service

THE relation between stream pollution and the extent of sewage treatment must always be a flexible one because of the numerous variable factors involved. Perhaps among the most important of these factors are those of biological and biochemical changes, generally in the direction of improvement, which collectively may be termed "natural purification." Obviously, the capacity of a stream for additional loading at any point must depend on the degree of purification of pollution previously received, as well as on the ability to digest material added at the point under consideration.

Furthermore, the degree of permissible pollution is dependent, among other things, on the uses to which the water is to be put. Obviously, a watercourse used as the source of a municipal water-supply demands different consideration from one that needs only to be kept from becoming a nuisance to sight and smell. Between these wide limits, local requirements, such as the preservation of fish life, recreational uses, and the like, will determine the limit of allowable pollution. The two extreme cases, that of public water-supply and that of nuisance prevention, may be briefly considered.

Protection of Water-Supply

The degree of bacterial pollution, more specifically the B. coli content, has become the general criterion of the fitness of water-supplies for drinking purposes, because this group of organisms is a most sensitive index of sewage pollution and at the same time is readily ascertained.

The criterion of permisible pollution in any stream used for water-supply is then concerned with the numbers of this organism that may be expected to be contributed, the rate at which they are eliminated in the stream after they are added, and, finally, the degree to which they may be removed by artificial water purification devices.

Studies of the bacteriology of sewage-polluted streams indicate a consistent seasonal change in per capita contribution and in rates of bacterial decrease. From carefully collected data of a number of cities, the annual average per capita contribution of B. coli per day at the point of maximum concentration in the receiving stream is about 249 billions, equivalent to a concentration of 102 B. coli per c.c. in a stream flow of one second-foot. This per capita concentration per unit of discharge changes from month to month quite consistently from 26 per c.c. in January to 226 in June, averaging for the winter months 55 per c.c. and for the summer months 158 per c.c., as shown in Table No. 1.

TABLE No. 1

Per Capita Contribution of B. Coli for Each Month, for One Second-Foot of Stream Flow, at the Point of Maximum Bacterial Concentration

Month	B. Coli per C. C. in One Second-Foot for One Person
January	26
February	61
March	93
April	43
May	130
June	226
July	205
August	104
September	120
October	134
November	43
December	39
SEASONAL AVERAGES	
Year	102
Summer (June–Oct., incl.)	158
Winter (Dec.–Mar., incl.)	55

If these observations are representative of general conditions (and this should be ascertained by extending studies of numerous streams of varying characteristics), the resulting concentration of B.coli from any population discharging sewage to any stream of known volume of flow may be computed from the relationship:

$$\text{B.coli per c.c. at point of maximum concentration} = \frac{\text{Concentration Factor} \times \text{Population}}{\text{Discharge in Second-Feet}}$$

It should be noted that this point of maximum concentration occurs, not at the sewer outlet, but at a location from ten to fifteen hours below in summer and fifteen to thirty hours below in the winter season.

Again, our observations indicate that rates of bacterial decrease in streams are more rapid in summer than in winter and are, moreover, modified by the initial maximum concentration as illustrated in Tables Nos. 2 and 3.

TABLE No. 2

Numbers of B. Coli per C. C. Remaining After Stated Times of Flow from Point of Maximum Concentration. Summer Season

Initial Maximum Concentration of B. Coli	B. Coli per C. C. Remaining After Interval of:								
	10 hrs.	25 hrs.	50 hrs.	75 hrs.	100 hrs.	125 hrs.	150 hrs.	175 hrs.	200 hrs.
75,000	30,000	9,800	2,900	1,000	420	190	84	37	17
60,000	20,000	7,900	2,300	800	350	150	70	32	15
40,000	14,000	5,900	2,000	600	270	120	57	27	14
20,000	7,600	3,000	1,070	420	190	94	47	25	13
10,000	4,000	1,600	640	270	130	68	36	20	12
5,000	2,300	1,100	410	170	78	42	24	15	12
1,000	440	210	80	30	13	5			
500	260	130	70	25	8				
100	40	20	12						

TABLE No. 3

Numbers of B. Coli per C. C. Remaining After Stated Times of Flow from Point of Maximum Concentration. Winter Season.

Initial Maximum Concentration of B. Coli	B. Coli per C. C. Remaining After Interval of:								
	10 hrs.	25 hrs.	50 hrs.	75 hrs.	100 hrs.	125 hrs.	150 hrs.	175 hrs.	200 hrs.
10,000	6,000	3,500	2,000	1,200	840	600	420	300	200
5,000	3,000	1,800	960	600	400	300	200	140	100
1,000	520	280	140	80	54	38	26		
500	240	120	60	32	21	15			
100	62	40	20	12	7				

If these relationships hold, it is possible to predict the numbers of B.coli remaining in the stream after stated intervals of time (and distance) from the sewer outlet, where the initial concentration is known, or where the sewered population and the volume of stream flow are obtainable.

Finally, observations on efficiencies of water treatment plants appear to point out that there are quite definite limits to permissible loading if safe effluents are to be produced. Thus, with coagulation, single-stage sedimentation, filtration and chlorination, the limiting load in the raw water seems to be about 8,000 B.coli per 100 c.c. for the production of an effluent meeting the revised Treasury Department standard. Where sedimentation in two separate stages is employed, the efficiency of purification is increased, permitting a raw-water B.coli index in excess of 10,000 per 100 c.c. In practice a reasonable factor of safety must necessarily be adopted, these figures representing the maximum permissible loads. Thus, if chlorination is to be considered as such a safety factor, observations so far compiled indicate the permissible limit of B.coli in the raw water to be between 1,000 and 1,200 per cubic centimeter.

There is then a well-defined relation between sewage pollution of streams and the necessary requirements of purification for the protection of sources of water-supply.

Prevention of Nuisance

The condition of a stream as regards nuisance is perhaps best indicated by its capacity for dissolved oxygen or its biochemical oxygen demand, which is a measure of the rate at which the contained organic matter is being oxidized. If this oxygen requirement exceeds the available dissolved oxygen supply of the stream, and the rate of consumption is moreover greater than the rate of replenishment obtained from the atmosphere, that is, reaeration, obviously the dissolved oxygen content will decrease. If this demand or withdrawal is continued, a state of complete deoxygenation will result. Septic or putrefactive activity then develops and we have a condition of stream nuisance, marked by the giving-off of objectional odors, unsightly, discolored water, and suffocation of fish and other forms of normal aquatic life. To prevent an overburden of the oxygen capacity, it is therefore essential to have some concrete knowledge of the oxygen demand of sewage, of the rate of oxidation of organic matter in the receiving stream, and of the rate of reaeration or replenishment of dissolved oxygen. Observations thus far made indicate that time, temperature, degree of mixing or turbulence, concentration of organic matter, and perhaps various other factors, must be taken into consideration for each specific case. It appears possible, however, to roughly estimate the required degree of oxidation or removal of organic matter from sewage before its discharge to a stream of known characteristics if nuisance is to be prevented.

The per capita 10-day oxygen demand of domestic sewage averages in the vicinity of 0.22-pound per day, so that the total oxygen requirement of the sewage is readily obtainable. The rate at which this requirement is satisfied in the presence of dissolved oxygen being defined by the general law of biochemi-

cal oxidation of organic matter, the elapsed time may be computed for the available dissolved oxygen to be used up if no reaeration occurs. If the rate of atmospheric reaeration is determined for the stream, the minimum depletion of dissolved oxygen may then be computed, as well as the time required to reach this condition following the addition of the pollution. Conversely, if it is desired to prevent this depletion of dissolved oxygen from dropping below a definite minimum, the original permissible load of oxidizable organic matter, or the limiting numbers of sewered population to effect this result, may be estimated.

Broader fields of observation, covering streams of various characteristics, will aid in establishing the general applicability of these relationships. It is to these lines of research that the Public Health Service studies of stream pollution are devoting considerable attention.

An Open-Air Theater That Was a Reservoir

THE transformation of an abandoned circular reservoir into an open-air Greek theater to seat 5,000 persons has been completed by the municipality of Jacksonville, Ill. Professors from the Chicago Art Institute designed the unique auditorium and also supervised its construction. The stage is made on three levels to permit instantaneous changes of scene without curtains. The theater is owned by the city. It is declared to have better acoustic properties than those open-air theaters which were constructed by the ancient Greeks.

How to Speak

Suggestions for Public Speakers from the Journal of the National Education Association

1. *Speak correctly.*—Correctness and preciseness in the use of the mother tongue is one of the first marks of an educated man.
2. *Speak slowly.*—Rapid speakers do not hold the attention of listeners. Speaking slowly gives the opportunity for emphasis and allows time to think.
3. *Speak carefully.*—Take care of the vowels, and the consonants will take care of themselves. Breathe deeply, so that you will keep up the voice until the last word is spoken.
4. *Speak simply.*—The best words in the English language are the short words. We do not talk for ourselves—we know what we think—but we talk so that others may know what we think.
5. *Speak courageously.*—Reserve is force, timidity is weakness, and success belongs to the strong. If the brain is filled with a great enthusiasm, there is no room for fear.

Regional Planning Makes Suburban Federations Imperative

By William L. Bailey
Professor of Sociology, Northwestern University

IN view of recent attention to the suburban movement as a major phase of the current development of American cities, it is well to remember that this movement is relatively less important in recent years than formerly. If viewed historically, a marked retardation in the movement is actually in evidence. This is obscured by the fact that formerly suburban expansions were annexed piecemeal about as fast as they appeared on the cities' limits. In the entire history of American cities there are only about a dozen cases of annexed suburbs which had developed to over 25,000 population prior to annexation. This was due, no doubt, to the fact that facilities for transit were limited and therefore the suburban communities were very close and hence ripe for early annexation. The abnormal growth of American cities both in population and area is in large degree to be accounted for by such suburban accretion. And these accretions were relatively more important for the cities than the annexation of corresponding suburban zones would be to-day.

Latterly, however, rapid transit has enabled suburban communities to develop at greater distances from the city limit. The average commuting distance is, according to figures of the Interstate Commerce Commission, some fourteen miles. For a generation preceding the introduction of the interurban electric, the steam railroads furnished the transportation, and the suburbs were strung along these in a continuous series. The electric lines more recently—but especially the automobile—have enabled the interspaces to develop. This remoter and more wide-spread suburban life was naturally less available for annexation than the suburbs of the earlier type. Moreover, the cities had flung their municipal limits far out, leaving sparsely populated territory within, substantially surburban in character. Annexation has thus been greatly retarded in recent years.

A Check to Metropolitan Imperialism

Very many of the communities now included in suburban zones have had a lengthy history as municipalities, and hence possess considerable civic spirit. They have commonly done much in the way of community experimentation, and the results have conduced to a strengthening of that spirit. And in general, such communities have, with recent attention directed to the suburban movement, become conscious of themselves as "suburbs." Metropolitan imperialism seems due for a check!

To-day there are some fifteen hundred communities of all sorts and sizes in the suburban zones, giving homes to some dozen millions of suburbanites, growingly conscious of living a separate and different life from that of their central cities. A million of these are in communities with populations of over 100,000, while almost half of the total suburban population is in cities of 25,000 to 100,000. These have developed sufficient local business life, social institutions, and community spirit to withstand annexation. In a few notable cases, such as Brookline (in the Boston area) and Highland Park and Hamtramck (Detroit area), they have allowed the city to surround them and have still held out for independent life.

Many city suburbs stand contiguous to the metropolitan city and act as a buffer between it and the more strictly suburban places beyond. What they do in relation to annexation will largely determine what is to happen in the suburban zones.

Moreover, political separatism and localism are marked in suburbs. The suburban zones are a tangle of separate civic units. This is the case whether they are residential or industrial in character. And the fact that a large percentage of these communities are contiguous only serves to enhance their localism.

The general situation in suburban America is undoubtedly ripe for experimentation with a suburban federation.

In Chicago's North Shore Region

It is quite natural that such an organization should appear in Chicago's North Shore region. There is perhaps no better case of the form which recent suburban expansion has taken than this strip of half a dozen cities and towns

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THE WINDING STREETS AND BEAUTIFUL WOODLAND OF LAKE FOREST, AS WELL AS ITS CLAIM TO HAVING A GREATER PER CAPITA OF MILLIONAIRES THAN ANY OTHER COMMUNITY, HAVE MADE THIS NORTH SHORE VILLAGE NATIONALLY FAMOUS

within thirty miles, comprising about 100,000 people.

For Chicago's suburban expansion, although not comparable to that of New York in population numbers, and surpassed even by the suburban zones of other lesser cities, as for example, Boston, is particularly far-flung geographically; strikingly tenacular in distribution; and almost wholly the result of the outpush of the city. No independent community of any importance was able to arise in the near neighborhood of spectacularly growing Chicago. This suburban zone is a case of legitimate suburban expansion. Retardation of annexation is therefore all the more significant in this case. For no state line enters as a factor as in the cases of the New Jersey suburbs of New York and Philadelphia, except on the south side toward the industrial suburbs of which Gary is the chief. On the west and north sides the suburbs are almost wholly within the county. They are also continuous with the outlying residential portions of the city.

A generation ago this group of North Shore towns united into an association for the building of Sheridan Road as a trunk highway throughout the series. Such a project would to-day be carried forward by a park district. Later, common drainage problems have drawn some of them into the Metropolitan Drainage District, including an area almost threefold that of the city. Township high school units have also contributed somewhat to community of feeling. But mainly it has been the approach of the city by the filling in of the territory intervening between it and the suburbs, with urban developments of the apartment house type, that has led the suburban towns to assert their independence.

The lesser and remoter and non-contiguous towns were at first disposed to regard the larger and contiguous suburb—Evanston—as a case by itself. But Evanston led in a suburban movement to prohibit Sunday movies, while several of the remoter suburbs allowed them, and in the resultant discussion showed a definite intention to remain unannexed, as well as unassimilated, by the metropolis.

The agitation also brought out the fact that only by some sort of North Shore Civic Union could these communities save themselves, and

especially Evanston, from annexation ultimately. If Evanston—being a majority of the total population of the strip—should be annexed, nothing could prevent the rest from being absorbed later.

The Union contemplated was to be an association of commercial and civic representatives. The results in preserving the social life and standards, and especially the schools of the suburbs, were stressed, but the cultivation of local trading and civic control were also a vital factor. Such a Union could also cooperate the more effectively with the metropolitan planning schemes, both city and regional. It could present a united suburban front to any schemes which were in the interests of metropolitan expansion and centralization rather than cooperative, with the interests of the suburbs on a regional basis well in mind.

For it has been realized, here as elsewhere, that what is called indiscriminately metropolitan or, again, regional planning, is in reality too often rather of the former intention than the latter. The interests of the city are likely to dominate over those of the suburbs. For city planning is already a reasonably definite matter, whereas no such corresponding thought has been given to what suburban regions are or ought to be.

Regional planning makes suburban federations imperative.

Zoning and Platting Control

Zoning, too, has been especially active in suburban communities, and too often it has been merely negative in character. Only very limited business and institutional centers have been allowed to develop, with large suburban residential areas. This has led to the spectacular development of secondary business and social centers in the outlying parts of the metropolis—a notable case is "Wilson Avenue" in Chicago's North Side—or at the city limits. It has retarded the suburban movement. The various suburban regions about the larger cities must sooner or later unite to create such centers, in their own best interests. For if they do not appear in the suburban towns now existing, the suburban districts developing in the interspaces between the suburban stretches will certainly develop them.

State laws are in some places also giving municipal control of suburban subdivision, and this phase of metropolitan imperialism must

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HUBBARD WOODS, A CHARMING COMMUNITY NORTH OF WINNETKA, IS LAID OUT SOMEWHAT ALONG THE LINES OF LAKE FOREST

be watched by a suburban federation. The Chicago Regional Planning Association, in the common interest, has drawn up a model subdivision ordinance, which by the effective cooperation of the communities in the metropolitan district can doubtless be made the basis of a sounder form of control of this vital matter.

Suburbs have also been particularly active and forward in city planning, but not always with the regional idea in mind. In Chicago's North Shore, however, there are notable instances of suburbs gearing into the general scheme. Traffic conditions daily encourage this form of cooperation. The burden of taxation associated with increased through traffic must somehow be adjusted, and this can be done only by some sort of Suburban Federation.

Steps Towards Cooperation

An informal cooperative association or union of suburban communities, probably on a regional basis to guarantee sufficient common interest between the cooperating groups of suburbs, seems the necessary first step suggested. Recently the North Shore residential towns have united in a mosquito eradication campaign, and this serves as an introduction to cooperation on more vital matters.

Suburban America will probably never again see any such union as that which brought many Long Island communities together into Brooklyn and created this gigantic suburb, to become a borough of Greater New York. But the proposals for suburban federations are, under the conditions of metropolitan expansion of to-day and the present stage of the suburban movement, most significant and practical.

Where Ice Allied Itself With Fire

National Photo

IN FIGHTING THIS RECENT FIRE IN WASHINGTON, D. C., THE FIREMEN HAD TO STRUGGLE WITH THE SHEETS OF ICE THAT COATED STREETS, BUILDINGS, LADDERS, HOSE, AND EVEN THEIR OWN FACES AND GARMENTS

The Personnel Problem in the Public Service

By Fred Telford

Chief of Staff, Bureau of Public Personnel Information

SEVERAL reports dealing with the administration of the merit system in the United States have been published in recent years. In some cases these have led to somewhat acrimonious discussions because of differences in point of view and the lack of any generally accepted body of facts. The Conference Committee on the Merit System, consisting of representatives of the National Municipal League, the National Civil Service Reform League, the National Assembly of Civil Service Commissions, the Governmental Research Conference, and the Bureau of Public Personnel Administration, was formed for the specific purpose of preparing a statement which would take cognizance of the different points of view that prevail and at the same time set forth the conclusions which are accepted, as well as the practices about which there is at present no agreement.

A Consensus of Opinion on the Merit System

The preliminary report of the Conference Committee on the Merit System, which is abstracted in the accompanying article, has been published as the January issue of "Public Personnel Studies."

The Committee makes no extravagant claims for the report. Nevertheless it has produced a document which can be read from beginning to end in two hours and with which not only those interested in the improvement of the merit system in the public service, but also those who desire to acquaint themselves with modern methods of scientific personnel administration, should be familiar.

Copies of the report can be secured from the Bureau of Public Personnel Administration, 26 Jackson Place, Washington, D. C., at 35 cents each, the approximate cost of printing.

The members of the Conference Committee found, much to their own surprise, that when they had met several times around a common table their differences were chiefly as to details. In fact, the report is a unanimous one; when the Committee members were unable to agree with regard to the membership and method of selection of the public personnel agency, they considered it wise to describe the six different forms which have been advocated at different times, together with the advantages claimed for each by its proponents and the disadvantages urged against each by its opponents.

The body of the report is divided into six main parts, dealing respectively with the magnitude of the public personnel problem, the public personnel agency as a means of handling public employment matters, the functions of the public personnel agency, the membership, selection, and form of organization of the public personnel agency, the law establishing it and the rules under which it operates, and the appraisal of its work from the point of view of the operating officer and the taxpayer. The text is supplemented by tables giving the best available figures as to the size of the public service in various jurisdictions and the amount of the public pay-roll, and also by a draft of what the Committee considers a satisfactory law. In the law alternative sections are provided to establish any form of public personnel agency which may be desired.

That part of the report dealing with the number of public servants and the amount of the public pay-roll gives more detailed figures than any hitherto published. Accurate data for a number of the more populous jurisdictions, including the federal service of the United States, the state of New York, the state of New Jersey, the City of Minneapolis, and some fourteen counties and cities in New Jersey have been collected; the pay-rolls for some of these jurisdictions are also given. The Conference Committee is more conservative in its estimate of the size of the public service than some other bodies; its conclusion is that the number of public employees, excluding those in the military and naval service, those engaged on contract work, and those employed for less than half their time, is not less than 2,500,000 and probably is in excess of 3,000,000. The Committee likewise estimates the annual

cash payments for the salaries and wages of these public employees as not less than $3,500,000,000.

A detailed analysis of the functions which a public personnel agency ought to exercise in order effectively to handle public employment matters is given. The Committee concludes that the modern public personnel agency ought to have the power to classify and name positions, so that those substantially alike from the employment point of view will have the same title; that it ought to make recommendations to the budget officers and the appropriating body as to the proper rates of compensation; that it ought through suitable tests, to select employees for entrance to and promotion in the service; that it should have a part (as yet not definitely determined) in such matters as training, service (efficiency) ratings, transfers, leaves of absence, and the like; that it must exercise some functions in connection with lay-offs, removals, demotions, resignations, and other forms of separations; and that it should exercise a miscellaneous group of functions, including the checking and certification of pay-rolls before salaries and wages are paid, the maintenance of a complete roster of employees, the publication of literature relating to the public service, and the stimulation of employee cooperation in handling some employment matters.

The Committee declines to take any positive stand as to whether the public personnel agency should consist of one member who is appointed by the chief executive or chosen through competitive tests; should consist of the traditional three-member, bi-partisan, appointed commission or board removable practically at the pleasure of the chief executive; or should take some other form. It does point out that the public personnel agency must exercise quasi-legislative and quasi-judicial functions in addition to determining employment policies and handling a multiplicity of administrative routine work, and that the performance of these diverse functions should be borne in mind when the form and size of the personnel agency is decided. From the point of view of the layman, one of the most interesting parts of the report is the suggested standards for appraising the effectiveness of the public personnel agency's work.

The suggested law does not bear the label "model," but gives evidence of very careful thought. The organization of the subject matter and the arrangement of the parts is novel but thoroughly logical, while the wording is largely free from legal verbiage but at the same time simple and direct. It is just possible that some may object to the suggested law on the score of length, but it is shorter than many of the existing civil service laws and at the same time is complete, well proportioned, and easily understood.

Boston's First Honorary Mayor

Courtesy of Boston City Record
THOMAS N. HART, HONORARY MAYOR OF BOSTON

BIRTHDAY greetings from the city of Boston to Hon. Thomas N. Hart on his 97th anniversary on January 20 this year, were expressed in the announcement of his appointment as the first Honorary Mayor of Boston.

This title was personally conferred by Mayor Malcolm E. Nichols when he visited former Mayor Hart at his home on his birthday. Among the many others who called upon the Honorary Mayor on that day to extend their good wishes were City Hall employees of former days, and schoolboys from the Thomas N. Hart School, where the birthday anniversary of Boston's "Grand Old Man" is always remembered.

Mr. Hart is a native of Massachusetts and has lived in Boston since 1842. He was a member of the Boston Common Council and of the Board of Aldermen for several years between 1879 and 1886. In 1889 and 1890 he was Mayor of the city; in 1891-3 Postmaster; and again Mayor in 1900 and 1901. During these years and since, Mr. Hart has been identified with many societies and eleemosynary institutions.

London Makes a Mistake!

Unsatisfactory Arrangement of Buildings and Equipment at Croydon Airdrome Necessitates Expensive Removals and Reconstruction

By Archibald Black

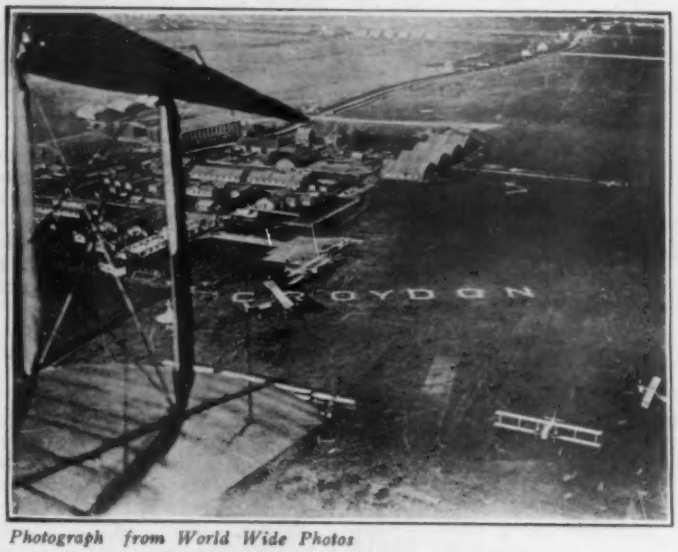
Consulting Air Transport Engineer, Garden City, N. Y.

THE greatly increased interest in air transport, which has been shown in the past several months, points to its early development in the United States. Several thoroughly substantial transport companies have recently been organized and plan to operate soon. In view of this, the interest in municipal landing fields should be renewed, and some comments on Croydon—England's greatest commercial air terminal—should be especially timed.

It has been part of the writer's self-assigned task in air transport development to carry on a considerable amount of educational work on the selection, equipment, design, and construction of the aircraft landing fields. This subject, it happens, had been generally neglected through concentration of attention on other phases of the new and rapidly developing means of transport. Although the selection and design of a landing field is just as much of an engineering problem as the selection and planning of a railroad route, this fact is not always fully appreciated.

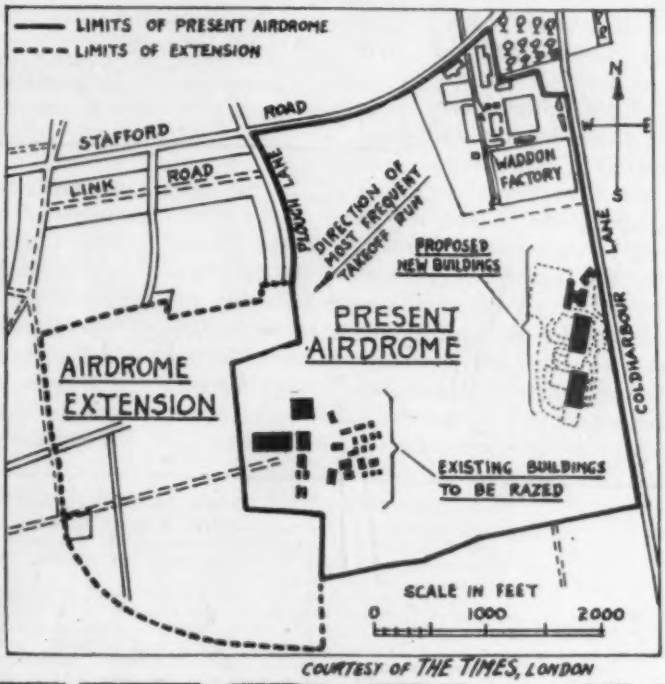
Significance of London's Experience

The Croydon Airdrome is the terminal landing field of the commercial airlines which connect London with the continental routes. This field has always been very well equipped and any casual observer might assume that it represented the last word in landing-field arrangement. However, there has been



Photograph from World Wide Photos

CROYDON AIRDROME FROM THE AIR. MOST OF THE BUILDINGS SHOWN ARE TO BE RAZED



COURTESY OF THE TIMES, LONDON

PLAN OF CROYDON AIRDROME, SHOWING CHANGES PLANNED IN FIELD AND BUILDINGS

gradually growing a recognition of the fact that insufficient attention had been given to the initial arrangement of the buildings on this field. Now word comes from London to the effect that most of the existing buildings are to be razed, the whole layout of the field is to be altered, an entirely new group of buildings is to be erected and the equipment transferred to a more suitable part of the field!

There is some significance in this news which should cause municipalities to investigate carefully the arrangement of their local landing fields before it becomes too late. Perhaps the writer may be pardoned for pointing out that this Croydon experience is exactly what he has been predicting would be the result of some municipal projects in the United States. This warning was reiterated frequently in technical papers and in contributions to several publications, one of these having appeared in THE AMERICAN CITY for August, 1923. In the case of the Croydon airdrome some of the errors can be regarded as excusable on the ground that the initial arrangement of the field was fixed during and immediately following the war and before we had available the experience which has now been accumulated. Nevertheless, it carries significance through the fact that some localities are depending upon former war pilots, who are not even familiar with air transport requirements, to select and arrange their landing fields to-day.

Re-Design of Croydon Field

The drastic nature of the changes which are to be made at Croydon may be judged from the accompanying plan of the field, which shows the present and the proposed arrangement. The arrow indicates the direction of most frequent take-off of airplanes as required by local conditions. It will be noted that this direction necessitates taking-off over or in close proximity to the present group of buildings. With the proposed extension of the ground (also shown on the plan), this existing group would become located in the center of the airdrome, a condition altogether intolerable in practice. The present building location also has the disadvantage of giving users of the airlines a lengthy ride from the main road to the point of departure of the airplanes. Under the new arrangement as proposed, this is eliminated and the group of buildings is brought close to the main road and to a station on the Southern Railway. Thus there is afforded the advantage of excellent railroad transportation, about a 20-minute run, between the field and the heart of London. Contracts have been let for the reconstruction and this work is reported as being under way at the present time.

Wanted—a Place to Land

An era of air transportation in this country, paralleling the growth of the automotive industry and of the radio art, is visioned in a report on civil aviation, made public on January 24, by the Joint Committee of the Department of Commerce and the American Engineering Council. A feature of this report of especial interest to municipalities is the recommendation that the several states enact statutes authorizing the municipalities to acquire and maintain with public funds and to lease landing fields, and that for the present the other phases of state jurisdictions relative to aeronautics be permitted to develop under the common law.

The tremendous expense to which municipalities may be put to find substitutes for airplane landing fields is suggested by the article on "An Airplane Landing in a Metropolis," in the February, 1926, issue of The American City, pages 187-190. Sound municipal statesmanship will not only provide reservations of proper location and size for air ports, but will lay out these fields in accordance with the best practice of the rapidly developing science of aviation. It is hoped that American cities may learn something to their advantage from the recent experience of London in this matter, as outlined in the accompanying article.

LEAGUE OF SOUTH CAROLINA MUNICIPALITIES ORGANIZED

A state-wide meeting of the city officials of South Carolina was called by Mayor R. F. Watson of Greenville and Mayor Foster Fant of Anderson, S. C., February 3, 1926. Between thirty and forty city officials of about as many cities were present at the meeting. They organized the League of South Carolina Municipalities.

John G. Stutz, Executive Secretary of the American Municipal Association, with headquarters at Lawrence, Kans., was invited to address the city officials on the subject, "Service and Future of a State League of Municipalities." The Executive Secretary also assisted the city officials in drafting their by-laws and perfecting their organization. The League of South Carolina Municipalities went to work at once. Its first move was to authorize its Board of Directors to draft a proposed amendment to their state constitution which would eliminate unnecessary red tape in city administration. C. S. Monteith, City Attorney, Columbia, S. C., was appointed Executive Secretary, and W. A. Coleman, Mayor of Columbia, President.

Night Lighting for Outdoor Sports

By O. F. Haas and H. M. Sharp

OUTDOOR sports lighting, though still a novelty in some respects, has passed the experimental stage and has an established position among real, practical applications of the art of illumination. It may be divided into two classes: (1) the lighting of standard courts; and (2) the lighting of large fields (each class of which presents a different aspect of the lighting problem).

On standard courts, while the illumination requirements in many cases may be severe, the activities are confined within definite limits, so that the engineer can at once choose the proper lighting equipment and designate the locations for this equipment which will give a satisfactory distribution of light and not interfere with the playing. Tennis, volley-ball, roque, and horseshoe pitching courts are examples of definitely bounded playing areas.

In the lighting of large fields, or areas on which activities are not confined within definite bounds, the problem becomes more difficult and oftentimes is peculiar to each individual project. The lighting of fields for trapshooting, football, and track meets, and the lighting of municipal parks, playgrounds, and bathing-beaches fall in this category. It is first necessary to determine the degree of illumination needed to carry on the particular form of recreation for which the lighting is provided. At the same time, it is important to determine whether or not the illumination is required on some particular plane or whether the plane itself is variable. If such is the case, it is necessary, of course, not only to light the field but to provide illumination in upper angles sufficient to follow the course of the ball, the discus, or the clay pigeon through the air with a degree of certainty that assures swift and accurate judgment on the part of the participants and spectators.

The problem of lighting for outdoor sports clearly resolves itself into one of so choosing and locating the lighting units that ample illumination is obtained at the place or places where it is needed, with the minimum of shadows and spottiness on the playing area. At the same time the supporting standards must be located well out of the way of the players and so arranged that glaring light sources do not defeat the purpose of the installation.

A Night-Saving Movement

An important by-product of the daylight-saving movement throughout the United States has been an increased interest in outdoor sports at night. In cities where, because of the opposition of agricultural interests and others, the clocks are no longer set forward an hour during the summer months, there is need for an artificial substitute for the lost hour of daylight; and even in cities where daylight-saving is still in force, the extra hour is all too short for many sport lovers.

For these reasons municipalities can render a much appreciated service to their citizens by providing adequate illumination of tennis courts, swimming pools, skating rinks and other recreation places. The National Lamp Works of the General Electric Company has made available in its recent Bulletin 51 many practical suggestions, excerpts from which comprise the accompanying article. Additional details are given in the pamphlet itself, obtainable on application to the company's Engineering Department at Nela Park, Cleveland, Ohio.

The Lighting Equipment

The choice of suitable equipment for outdoor lighting depends upon the characteristics of the lighting fixture and how well it meets the requirements of any particular application. There are four types of lighting equipment generally used for outdoor lighting — dome reflectors, deep bowl reflectors, angle reflectors, and floodlights.

The success of any lighting system involves many factors, such as adequate illumination, efficiency, general appearance, and lack of glare, shadows and spottiness, but, in the final analysis, all of these are regulated largely by two things, namely, the lighting equipment (reflector and lamp), and the location of this equipment.

Having determined the type of reflector to be used, the proper location and number of fixtures become of signal importance. It should be remembered that each type of lighting equipment gives a certain characteristic distribution of light, and for this reason can be depended upon to light only a definite portion of the territory. When the fixtures are too far apart, the lighting will be uneven and shadows will be pronounced. The higher the

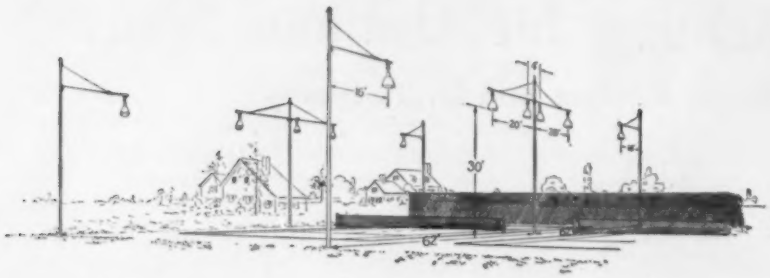
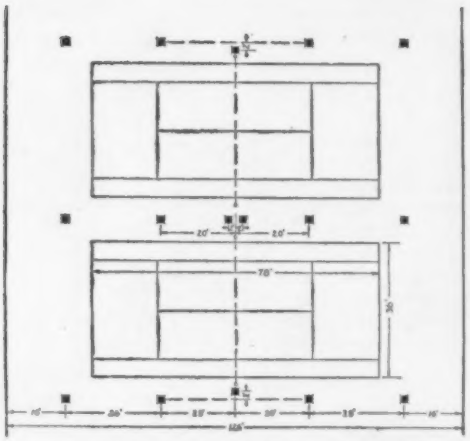


FIG. 1.—VIEW OF TENNIS LIGHTING SYSTEM, SHOWING AN OUTSIDE AND A MIDDLE ROW OF LIGHTING UNITS



FLG. 2.—PLAN VIEW OF LIGHTING SYSTEM FOR TWO OR MORE ADJACENT COURTS

fixtures are mounted, the fewer will be required, although larger lamps must then be used. In floodlighting, the locations of the lighting groups are chosen to give uniformity of distribution and to avoid glare and long, sweeping shadows.

The recommendations given herein for lighting the different outdoor recreational grounds will provide sufficient light for the full enjoyment of the sport. Any modifications which suggest themselves should be made only with the knowledge and understanding of the influence of all the various factors upon the success of the lighting system.

Tennis Court Lighting

The lighting of tennis courts embodies several features which are necessary to meet the rather severe requirements of this particular sport. The execution of any tennis shot depends upon the ability of the player to judge accurately and quickly both the velocity and the position of the ball at all times. Distracting images or shadows would, of course, prove to be a considerable handicap to a player who is in rapid motion and whose attention is closely concentrated on a swiftly moving ball. It is at once evident, then, that the illumination must be such as to facilitate rapid and accurate vision, so it is important that a high level of illumination be provided. One must be able to follow the course of the ball equally well at all levels, from the ground to a considerable distance in the air. It is also necessary that throughout this entire lighted space light be evenly distributed, since spottiness or unevenness in the illumination would render accurate judgment extremely difficult, because an apparent change in speed is noticed when an object passes from a light area into a dark space, or vice versa. Just as in any other lighting installation, glare must be carefully avoided or the entire purpose of the installation will be defeated.

Aside from the illumination requirements, every installation should be carefully planned so that all obstructions are well out of the way of the players. This necessitates the placing of the supporting poles far enough from the outside lines to permit freedom of over-boundary playing. (Figs. 1 and 2.)

Swimming Pools

Outdoor swimming pools vary considerably in size and methods of construction, which necessitate different lighting treatments. There are, however, four lighting systems which apply in the great majority of instances.

A large number of municipal pools for which the lighting requirements are very severe are of the class shown in Fig. 3. A general overhead lighting system consisting of standard domes located 20 feet above the pool and spaced on 30- to 40-foot centers is recommended; 750-watt or 1,000-watt white bowl lamps should be used. The reflectors should be equipped with disconnecting hangers so as to facilitate maintenance.

Rectangular pools of a size approximately 25 x 50 feet or 30 x 75 feet find wide use at country clubs and private homes. Satisfactory lighting for such pools is easily obtained by the use of four elliptical angle reflectors mounted at least 15 feet above the water along the sides of the pool one-quarter of the length

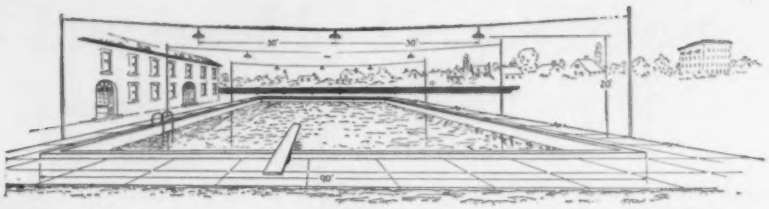


FIG. 3.—SUGGESTED LIGHTING SYSTEM FOR THE AVERAGE SWIMMING POOL

from each corner; 300-watt or 500-watt lamps should be used, depending upon the area to be lighted.

In many instances pools of this same general type are set in very attractive surroundings, requiring a lighting treatment which is appropriately ornamental. In such cases ornamental street-lighting units, four or six in number, depending upon the size of the pool, can be used. These units should be placed along the sides, as were the angle reflectors; 500-watt clear Mazda lamps should be used.

Large pools, that is, those whose area is greater than 10,000 square feet, are usually most satisfactorily lighted by means of floodlighting units. These should be mounted at least 40 feet above the ground in order to reduce glare and to secure the proper spread of light. Three or four poles should be used, depending upon the shape of the pool, and sufficient floodlighting units employed to provide about one watt per square foot of pool area.

Horseshoe Pitching Pits

Horseshoe pitching, or quoits, is rapidly becoming popular as an evening recreation because it is a sport peculiarly fitted to the "after work" hours. Park, playground, and recreation field officials are installing the pits in large numbers, for the space required is small and the outlay for equipment slight. The lighting requirements are very simple and easily met, as can be seen by referring to Fig. 4. This layout provides for a 200-watt white bowl lamp in a standard dome reflector, mounted 10 feet high on a 6-foot bracket arm. The supporting pole is placed behind and midway between two adjacent pits; it may also be used to support the score board.

Bathing-Beaches

In the interest of safety and general satisfaction, the illumination for bathing-beaches must necessarily be of sufficient intensity and of such distribution that all parts of the beach are visible from the life-saver's and overseer's stations. The recommended method employs about 25 watts per linear foot of beach with a maximum spacing of 400 feet between the groups of floodlights.

Hockey Rinks

The dimensions for hockey rinks are not consistent, but fall within certain maximum and minimum lengths and widths. Fig. 5 represents the lighting layout for a large-sized rink (100 by 200 feet). The fixtures

FIG. 4.—LIGHTING SUGGESTION FOR HORSESHOE PITS

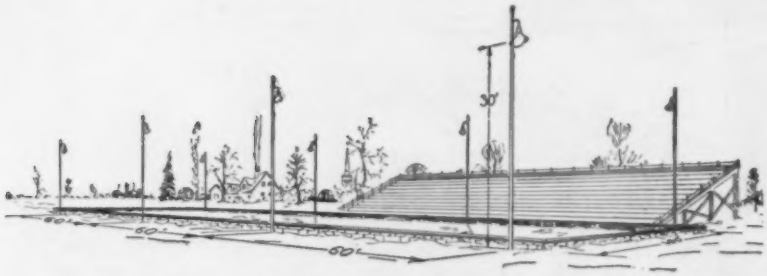


FIG. 5.—ANGLE REFLECTORS ADEQUATELY ILLUMINATE THE HOCKEY RINK

must be located so that no part of the equipment extends out over the rink, since snow or ice dropping from them would make the skating surface uneven. Consequently, four angle reflectors mounted 30 feet high on each side of the rink are used to distribute the light throughout the playing area. The supporting poles are mounted 60 feet apart along two sides of the rink; 1,500-watt lamps will assure sufficient illumination to enable the players and officials to follow the swiftly-moving puck at all times. If the rink is of medium dimensions (112 by 58 feet), three units of 1,000-watt size on each side will be adequate.

Football Fields

Football fields are used for track meets, pageants and similar events of a spectacular nature, as well as for football games and practice. The lighting system should be designed with this in mind. A very satisfactory system is shown in Fig. 6. Four towers are employed, each at least 70 feet high and carrying 15 floodlights, each of which uses a 1,500-watt lamp. (These may be arranged in some characteristic letter or symbol of the school.) The distance from the group of floodlights to the edge of the playing field should not exceed 100 feet.

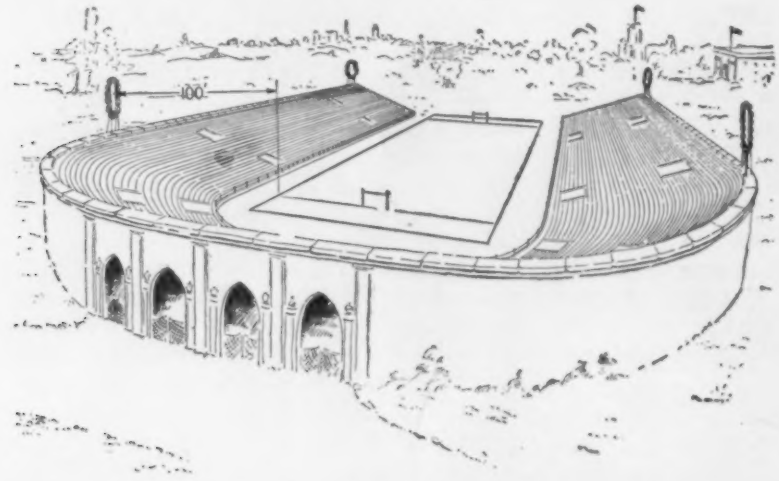


FIG. 6.—A LIGHTING SYSTEM—THE OPEN SESAME FOR NIGHT ATHLETICS, CARNIVALS, PAGEANTS AND COMMUNITY GATHERINGS

The Next International Conference on Housing and Town Planning

THE next International Conference on Housing and Town Planning will be held in Vienna in September, 1926, in response to the invitations of the Mayor and City Council of Vienna, supported by the Austrian Government and the Austrian housing and town planning organizations. The principal subjects for discussion will be:

A. Examination of the conditions of land tenure in each country and of how far they permit practical results respecting town and regional planning.

B. The rational distribution of cottage and tenement houses.

The Conference and Exhibition are being arranged by the International Federation for Town and Country Planning and Garden Cities, of which Ebenezer Howard is President. All correspondence should be addressed to H. Chapman, the Organizing Secretary, 3 Gray's Inn Place, W. C. 1, England.

Vienna is a city of much interest from the point of view of town planning and housing. It has had a zoning plan since 1893 and a general plan since 1894. It has 11,000 acres of forest and meadow belt. A new town planning scheme is being prepared for the large town area on the left bank of the Danube. A five-year program of house building was started in the fall of 1923 to provide 25,000 dwellings. 6,700 dwellings were built in 1924 and 8,800 in 1925, and the greatest part of the program will be completed by the end of 1926. Three thousand of these dwellings are of the cottage type.

Land Values Increased by Paving Street

By Albert S. Blank
City Engineer, Belleville, N. J.

IN the spring of 1924 the Board of Commissioners of Belleville, N. J., took steps to have the New Jersey State Highway Commission enter into contract with the municipality to take over Washington Avenue, Belleville, N. J., as a state road and to share in the cost of paving.

The road, which is about 1⅞ miles long, was at that time in an exceedingly poor condition. The electric car tracks were located at the sides of the road, and the only portion which was in fairly good condition was a strip of about 20 feet between the tracks. From the edge of the tracks to the curb, earth shoulders existed, and in most cases, the curbs were completely buried with earth, making the parking of cars dangerous and inconvenient. This naturally caused a great loss of trade to local merchants.

A VIEW ON WASHINGTON AVENUE, BELLEVILLE, N. J., SHOWING IMPROVEMENT OF STREET AND REMOVAL OF STREET-CAR TRACKS TO CENTER
At left.—Improved roadway. At right.—Street in original condition

About April 15, 1924, an agreement was entered into by Belleville and the state whereby the paving was to be constructed on an equal-payment basis. A contract was let shortly after the agreement was made, and work on the improvement was started.

In this undertaking many obstacles in construction were encountered. It was necessary under the contract to keep a portion of the road open at all times to local traffic. The widening of the street 10 feet—5 feet on both sides—necessitated the placing of new water and sewer laterals every 25 feet, and extending the existing laterals to the new curb line. Fire-hydrants, telephone, telegraph and electric poles had to be reset. The electric car tracks were constructed in the center of the road, and trolley service maintained uninterrupted. All trees along the avenue had to be removed in order to make way for the new construction. New concrete curbs of substantial size were constructed throughout the avenue, and new storm sewers were built, together with 38 new large-sized catch-basins. The returns on curbs leading to side streets were increased to a minimum radius of 15 feet.

By December, 1924, half of the paving was completed. During the winter months when weather conditions would permit, all storm sewers and sub-constructions were completed so as to have the remainder of the road in readiness for paving in spring. As soon as paving was considered practical, work was pushed forward with all possible speed. And in August, 1925, the paving of the road was completed.

Immediately after the completion of the paving, construction was begun on a uniform width of sidewalks. This sidewalk was constructed from the curb line, for a width of 10 feet, by the municipality. In many places, however, the property owners had the walk constructed by the contractor the entire width of 20 feet. A "Great White Way" of 144 arc lights on ornamental standards then came into existence, and on December 2, 1925, a celebration was held officially opening the rejuvenated highway.

During and since construction, Washington

A STRIKING PAIR OF PICTURES SHOWING THE IMPROVEMENT EFFECTED IN WASHINGTON AVENUE, BELLEVILLE, N. J., THROUGH REPAVING

Avenue has taken on new life, new apartments and stores are being built, land values on the avenue in many cases have practically doubled, and even values some distance off the highway have greatly increased. What was at one time a seemingly dead and poorly paved street has now become an important link in the state's system of highways.

This work was instituted by Frank A. Neary, Board of Commissioners, Belleville, N. J., and Director of the Department of Public Improvements.

Preliminary Treatment of Sewage as Affecting Rates on Trickling Filters

By Almon L. Fales

Metcalf & Eddy, Consulting Engineers, Boston, Mass.

THE application of crude sewage to a trickling filter is likely to result in rapid clogging of the filter, even though the filter medium be relatively coarse and the rate of application relatively low. Grit chambers and coarse screens alone cannot ordinarily be depended upon to prevent filter clogging.

Fine Screening

Fine screens will afford sufficient preparatory treatment if the filter medium be coarse enough to permit the unloading of the remaining solids which accumulate in the filter, and if the rate of operation be low enough to produce a satisfactory effluent. More nearly complete removal of suspended solids will make possible higher rates on trickling filters, for two reasons: first, because of the reduced load of organic matter; and, second, because it makes possible the use of finer media which for the same cubical contents present a greater surface area for bacterial action and afford a longer period of bacterial contact with the sewage applied.

Sedimentation

Sedimentation tanks will remove solids which are too small to be removed by the finest screens which it is practicable to use. The percentage removal of suspended solids by fine screens will vary according to the strength and character of the sewage, particularly as regards its freshness and the extent of comminution of suspended matters. The greater the proportion of relatively coarse matters, the greater the efficiency of the screens. The efficiency of sedimentation is also greater with fresh sewage containing a relatively large proportion of uncomminuted suspended matter, but the advantage is not so great as in the case of fine screens. In other words, the fineness of suspended solids does not reduce sedimentation tank efficiency to the same extent that it does the efficiency of fine screens. The advantage of sedimentation over fine screening will vary greatly with different sewages, but under average operating conditions sedimentation will probably remove about five times as much suspended matter as will be removed by fine screens, leaving in the effluent about half as much suspended matter as in the effluent from fine screens.

The comparative loads with effluent from fine

screens and from sedimentation tanks cannot be based solely on the content of suspended solids. The dissolved and colloidal matter, the amount of which is substantially the same in the two effluents, must be taken into consideration. On the other hand, the loads cannot safely be based on the total organic matter irrespective of the proportion in suspension, because the suspended matter accumulates largely in the upper part of the filter, tending to reduce the permissible rate of operation without clogging. As previously pointed out, with a smaller amount of suspended solids, smaller filter media can safely be used and the rate of operation correspondingly increased.

George W. Fuller, in a paper read before the Indiana Sanitary and Water Supply Association on March 28, 1918, stated:

"I assumed in my Indianapolis investigations that with the same area of sprinkling filters receiving the effluent of Imhoff tanks and fine screens respectively, the depths of beds should be in the ratio of 7 feet to 10 feet. In other words, per unit volume of filtering material, fine screen effluent should be applied in the proportion of 7 volumes as compared with 10 volumes for the more completely clarified tank effluent."

Mr. Fuller recommended fine screens and relatively deep filters, and proposed cutting out units in rotation, for drying and hosing, to facilitate the unloading of accumulated solids. Few, if any, fine-screen trickling filter plants have been built up to the present time.

Septic Tanks

Septic tanks are less efficient in the removal of suspended solids than Imhoff tanks or sedimentation tanks from which the sludge is removed at frequent intervals. The decomposition of the sludge in septic tanks produces gas which causes masses of sludge to rise, and portions of this may be carried away in the effluent. This condition was so marked in the case of an experimental septic tank at Worcester, Mass., that the experimental trickling filter receiving this effluent became clogged to such an extent that it was necessary to remove and wash the filtering material to a depth of about 2 feet.

Another disadvantage of the septic tank for preliminary treatment is the foul odor likely to be given off by the tank effluent when it is sprayed on trickling filters. Further, it is quite generally believed that for the desired bacterial action, septic sewage is not as favorable as fresh sewage.

Chemical Precipitation

Chemical precipitation tank effluent was applied to an experimental trickling filter for over a year at Worcester, Mass., and the results were compared with those obtained by similar experiments using the effluent from plain sedimentation. The conclusion reached was that about 30 per cent more of the chemical effluent than of the corresponding settled sewage could be applied to trickling filters and produce an effluent of like quality, but that the increase in rate made possible by the chemical precipitation was more than offset by the additional cost of this treatment.

In England the use of chemical precipitation as a preparatory treatment for trickling filters is still quite common, and in most cases where this preparatory treatment is not used, thorough sedimentation is afforded. In this connection it should be borne in mind that as a rule English sewage is much stronger than American sewage, the water consumption in England averaging less than half as much as in this country.

Activated Sludge

At Birmingham, England, an activated sludge plant has been operated for preliminary treatment of a portion of the sedimentation tank effluent applied to the trickling filters, and it has been found that with an aeration period of one hour, and re-aeration of the sludge returned, the rate of application to trickling filters can be increased two to three times and still obtain a better filter effluent. The conclusion reached is that it will be cheaper to add activated sludge units for such preparatory treatment than to build additional trickling filters.

Aeration at Birmingham is secured by mechanical means, and this also creates sufficient velocity to maintain the sludge in suspension while passing through the aeration channels. The aeration tank is called a "bio-flocculation tank," and the sludge re-aeration tank is called a "sludge bio-generation tank." The entire aeration plant is called a "deodorizing and partial purification plant," one great advantage claimed for this plant being that it eliminates the smell that would otherwise be created by spraying sedimentation-tank effluent on the trickling filters.

John D. Watson, in his booklet on "The Works of the Birmingham, Tame and Rea District Drainage Board," July, 1923, explains the advantage gained by this preparatory treatment, as follows:

". . . it is shown that flocculated sewage, which has been deprived of colloidal matter, is much more readily oxidized, . . . The bacteria beds will thus be relieved of work for which they

are not well fitted. They are no doubt capable of dealing with humus which arises from the particulation of colloidal matter, provided sufficient time and favourable conditions are given, but it is not profitable to keep them employed on work for which they are not well fitted."

It does not follow from the Birmingham experience that the activated sludge process can profitably be employed for preliminary treatment of the relatively weak sewage in this country, but the possible advantages of such treatment should not be lost sight of. It seems probable that in the majority of cases in this country efficient sedimentation will be the most economical preliminary treatment for trickling filters at municipal sewage treatment plants handling the usual sewage and wastes.

ACKNOWLEDGMENT.—From a paper read before the American Society for Municipal Improvements, at Des Moines, Iowa.

Water-Works Improvements, Litchfield, Illinois

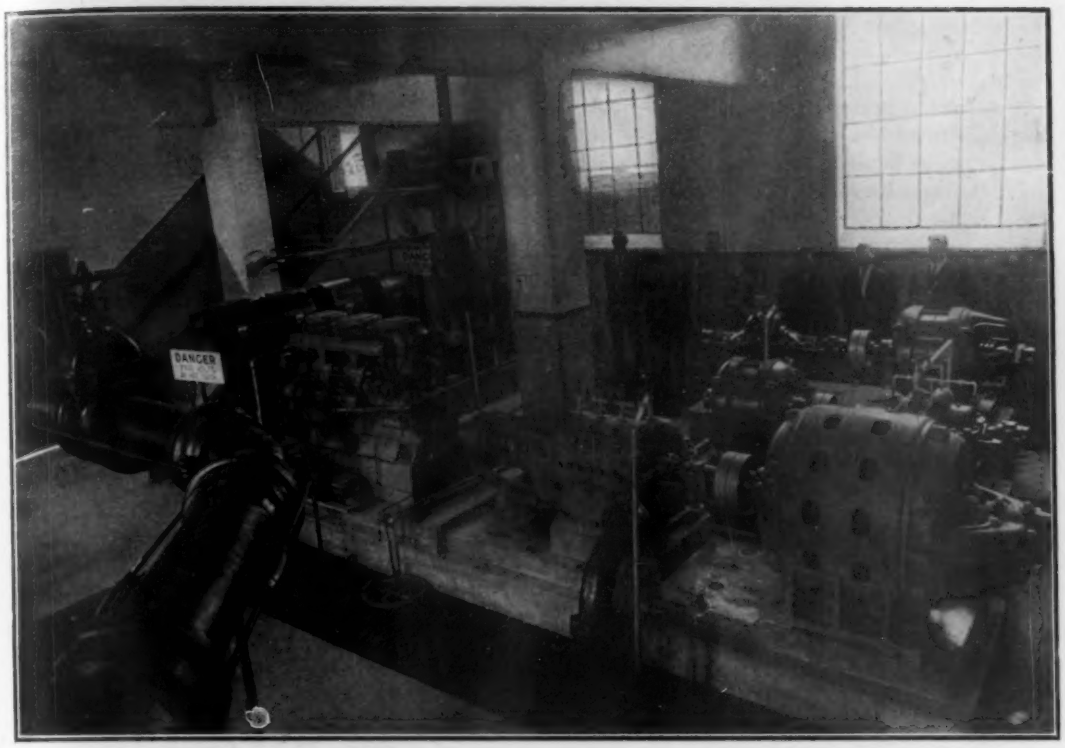
By John J. Murray

THE original water-works of Litchfield were installed in 1873 and comprised a small impounding reservoir to the south of the city, a pumping-station, and distribution mains. This supply, on account of small watershed area, namely, 2¾ square miles, and limited sixty-million-gallon storage, soon proved insufficient. Moreover, the quality of the water, due to shallow flowage in the reservoir and to barnyard pollution, was exceedingly bad, both from the physical and from the sanitary point of view.

In 1891, in return for developing an additional supply from Shoal Creek two miles to the east of the city, a water company was granted a franchise to supply water to the city and to take over the operation of the existing water-works property belonging to the city. In time the combined supply of water from the reservoir and from Shoal Creek became insufficient to meet the requirements of the city, which were relatively large on account of the use of water by a number of railroads.

Since 1895 various attempts have been made by the city to recover the water-works with a view to carrying out improvements. Some of the earlier attempts were not fair to the water company. However, the water company on its part threw various obstructions, political and otherwise, in the way of the city's recovering the water-works. It was not until 1922 that the city made a determined effort to obtain possession of its own and the water company's property and to install new works. After prolonged negotiations, followed by litigation, a compromise agreement was finally reached upon the price to be paid by the city for the water company's interests.

THE NEW WATER-WORKS BUILDING AT LITCHFIELD, ILL.



INTERIOR OF LITCHFIELD, ILL., PUMPING-STATION, SHOWING THREE OF THE SIX ELECTRIC PUMPS

Meanwhile the city had engaged the services of Pearse, Greeley & Hansen, consulting engineers, Chicago, to review the entire waterworks situation with a view to determining the best and most economical development for present and future needs. Seven different projects were considered with reference to adequacy, suitability, and cost. These included a number of surface-water sources and also ground-water sources.

The development finally determined upon comprises:

1. The abandonment of the original water-supply to the south of the city
2. The impounding of so-called East Creek, a tributary of Shoal Creek, by means of an earthen dam 58 feet in height, providing a maximum water depth of about 52 feet
3. The continued use of the existing Shoal Creek intake as a supplemental supply after suitable repairs were made
4. The installation, at the approximate location of old Shoal Creek pumping-station, of a modern filter plant and new pumping-station
5. The paralleling of the existing 10-inch pipe line to the city with an additional 10-foot pipe line of cast iron
6. The construction of an elevated tank in the city
7. The extension and reinforcement of the city distribution system

The impounding reservoir has a capacity of 300,000,000 gallons, and the development is capable of yielding three-fourths of a million gallons per 24 hours during a dry year such as might occur once in 25 years. Supplemented by pumping from Shoal Creek, however, the entire development is capable of yielding, during a dry year, two million gallons per day, which, according to estimates based on probable population growth, will meet the requirements of the city for domestic, industrial, and railroad purposes at least until the year 1945. The present installation for pumps and filters is based upon a million and a half gallons nominal daily consumption, but the design is such that the equipment can for short periods meet a daily consumption 50 per cent in excess of this, or two and one-quarter million gallons, which will meet the maximum requirements of the city until about 1940.

The development carried out has the advantages of being the nearest to the city, of placing the operating elements close to a railway, and of being located near other available sources of supply, thereby permitting practically indefinite expansion. Following the year 1950 it will be feasible to develop, by

impounding, a neighboring tributary of Shoal Creek known as Beacon Creek. This will yield an additional one and one-half million gallons per day during a dry year, which will be sufficient to meet the requirements of the town until it has a population of 13,000, which, it is estimated, may occur between the years 1960 and 1970. Should further growth of the city take place, it will be possible to impound Shoal Creek itself (which has a watershed area of 110 square miles) in such a manner as to yield twenty-five million gallons per day during a dry year, which is sufficient for a city with a population of over 100,000.

Method of Financing

The financing of the water-works enterprise is of particular interest to other cities which have limited bonding capacity. The bonding power of the city of Litchfield was merely sufficient to buy out the interests of the water company, about $50,000, and to pay for the erection of an elevated tank in the city, about $20 000. All of the work outside of the city, comprising land for reservoir, dam, pumping-station, filter plant, and pipe line to city, amounting to $300,000, has been financed by the device of a holding company. This company, known as the Citizens Water Works, Inc., was organized with authority to issue $300,000 worth of preferred stock bearing 6 per cent interest, and a nominal amount of common stock to be held by the directors in order to enable them to qualify. A campaign was put on for the sale of the preferred stock, and all of it was taken up locally within a period of two weeks, a remarkable demonstration of energy and civic pride in a city of the size of Litchfield.

The water company has a contract with the city whereby the water-rates are to be adjusted from time to time in a manner that will yield sufficient revenue to cover all operating expenses, to pay interest on preferred stock, and to provide for the retirement of the preferred stock within a period of twenty years, at which time the ownership of the water company's property will be turned over to the city, and the water company will be dissolved.

Extension of Mains by Assessment

The extension and reinforcement of the distribution system is being installed by special assessment, each property owner benefited being assessed according to the benefits. A portion of the cost of this improvement is also being assessed against the city to cover street intersections, fire-hydrants, etc.

Metering

All water will be sold on a meter basis as soon as all services can be metered. The majority of services are metered at the present time. The charges made for water are based on two elements—first, a readiness-to-serve charge, and, second, a quantity charge, the latter being graded according to quantity of water used, essentially in the manner recommended by the New England Water Works Association. A reasonable charge is also made upon the city, payable out of general funds, for fire protection. The entire operation of the water-works will be carried out by the city, but the company will read meters and collect water-rates.

While the city of Litchfield is deserving of special credit for its enterprise in solving its water-supply problem involving a total expenditure of $400,000, the solution of the problem was absolutely necessary to permit of a proper development of the city. Hitherto the growth of Litchfield has been very slow, as shown by census returns. This slow growth, accompanied by loss of some industries and failure to gain others, is almost directly attributable to an inadequate and poor water-supply. With an ample water-supply renderd clear and pure by filtration and sterilization with chlorine Litchfield hopes and expects to attain a much more rapid development, a development to which it is normally entitled by virtue of its favorable geographical position and exceptional railroad facilities.

Cross-Connections Prohibited in New York State

BY regulations adopted by the Public Health Council of New York State, cross-connections between domestic water-supply systems and any other systems of water-supply throughout the state were prohibited, with the exception that such connections may be made if the other supply "is regularly examined as to its quality by those in charge of the potable water-supply" and is "found to be potable."

According to the regulations, all present physical connections, with the exceptions mentioned, must be severed by July 1, 1926, unless they include two gate-valves with indicator posts, two check-valves of the Special Factory Mutual Fire Insurance design or equivalent, with drip-cocks and gages for testing, all located in a vault of water-tight construction accessible for ready inspection. Under these

conditions, the date for the complete physical separation is extended to July 1, 1928.

Water from a satisfactory supply may be used as an auxiliary to another supply providing the domestic supply is delivered into a tank open to atmospheric pressure and discharged above the high-water line of the tank. Where industrial plants have a satisfactory water-supply available, no other supply is permitted to be delivered in such a way that it can be used for drinking purposes, unless the other supply is approved by the local health officer. If no public water-supply is available in an industrial plant, then the regulations require that the water for drinking and other domestic purposes shall be of safe sanitary quality approved by the administrative health officer of the community.

France Investigates Paving

Translation of a Paper by the Prefect of the Seine

IN a recent issue of *La Journée Industrielle* the Chief Administrative Officer of the Department of the Seine, which includes the city of Paris, gave some interesting opinions of various classes of street paving materials. The Prefect of the Seine described successively the advantages of asphalt, trials made to discover the ideal system of highway surfacing, and improvements which have been realized. Efforts have been made to locate products to replace macadam, which is non-resistant to Paris traffic; asphalt, which is too smooth; and, finally, wood block paving, because of its too burdensome maintenance problems.

The Prefect of the Seine sets forth his experience in the following manner:

1. *Improvements in Wood Block Paving.*—Interesting results have been obtained, but it appears to be an established fact that the improvements have been realized only at the cost of greatly increased expenditures.

2. *Search for Substitutes for Asphalt.*—Concrete and asphaltic mortars mixed in cylinders have given good results in streets where the traffic is light and rapid, and, on the contrary, have been unsatisfactory in narrow streets with congested traffic and where the streets are frequently cleaned, asphalt being much more of a success in such cases. Asphalt block has given good results on the Avenue Henri Martin and the Avenue du Bois-de-Boulogne, which are wide and parked residential streets; and poor results on the Rue de Babylone and Rue Lobineau, which are narrow streets with congested traffic. Bituminous concrete surfacing lends itself to streaks and depressions. Thanks to the presence of large aggregate in the mixture, it is hoped that these pavements will be less smooth than asphalt [probably referring to sheet asphalt] even after the disappearance of the streaks. The lasting qualities of this product have not yet been determined. Synthetic asphalt is equivalent to asphalt naturally mixed, but is a little less costly. Cement concretes are not very smooth and not costly. The administration reserves its opinion for the present as to their durability. Nevertheless, the actual impression is favorable with respect to solidity, in spite of several disappointments in the beginning. Experiments have been made with tamped concrete made with an extra rich proportion of super-portland cement, which seem to work out well.

Reinforced Concrete

Reinforced concrete and concrete without reinforcement will be tried in 1926 in the Rue de Flandre, a street with heavy traffic.

3. *Mosaic pavements in natural or artificial materials* (United States paving bricks, "Silifer," "Sigot," etc.), constitute a perfect solution from the points of view of cost of placing and maintenance, but this pavement is relatively noisy. Search will be made to improve it by adding a surfacing coat of "Spranex" or a bituminous emulsion. Brick pavements should be followed up, as they appear to be suitable for streets which have practically no horse-drawn traffic. On the other hand, the breakage must be considered.

4. *Non-Slipping ("antiderapants") Surfacing.*—The Prefect states that this surfacing material will be experimented with on asphalt pavements. These trials, induced by similar experiments made in England, will be carried out in the near future, and the English products, "Colas" and "Rubgrip," manufactured with a rubber base, will be used. In conclusion, Monsieur Bouju refused in any case to condemn the use of asphalt.

We are indebted to George Orr, American Consul in Charge, Paris, France, for this interesting summary of studies and experiments in the Department of the Seine.

TWO SCENES AT THE CORNER OF WEST SEVENTH AND PEARL STREETS, SIOUX CITY, IOWA
At the left are shown the three bridges within 100 yards which existed before the conduit was built. At right—the same location after the conduit was completed, showing the elimination of the bridges, the repaved street and the widened intersection

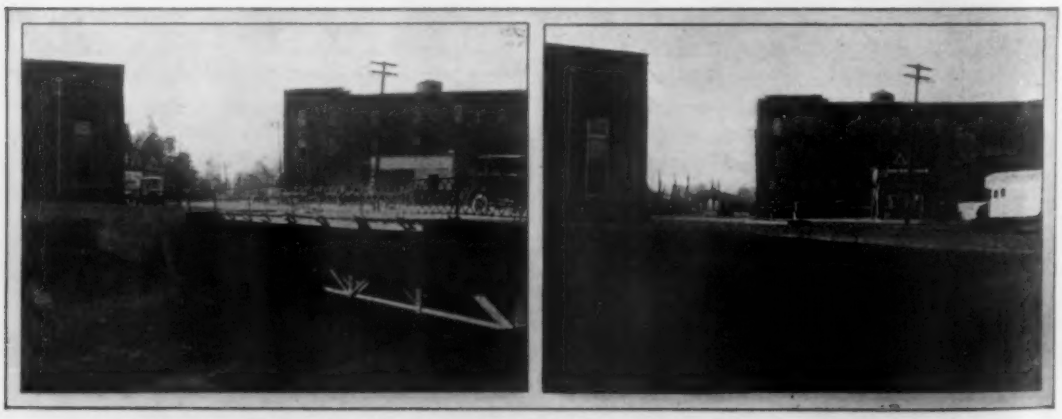
Sioux City Puts Ugly Creek Under Cover

By John D. Adams

OVER seventy-five years ago the business district of Sioux City was laid out long two sides of Perry Creek, which has become an ugly, and at times dangerous, little river pouring through a portion of the business district, greatly reducing the value of the property and restricting the class of business that can be carried on near it. Probably there has never been a Sioux City administration or city engineer that has not considered steps to divert the creek from the business district or put it under ground. The first step has just been completed and the contract let for another section of the work which will take the creek entirely out of the way of the business district by placing it underground in a concrete conduit.

The first section, which was completed last year, sold the proposition to Sioux City and assured the early completion of the entire project. It was designed by L. N. Hintgen, City Engineer for four years. He submitted his design after studying the creek for many years from its source to its mouth, and also familiarizing himself with its history, and after taking numerous measurements.

Several things were accomplished in the placing of the concrete tube. The creek was straightened, five bridges were eliminated, two new streets were opened, giving new outlets from the business district, three multiple intersections were opened, new frontage property was opened, and the entire section of Sioux City lying beyond the conduit from the



AN INTERESTING PAIR OF "BEFORE AND AFTER" PICTURES OF PERRY CREEK
At left.—A typical scene before the first section of the conduit was built. At right.—The same view after the conduit was built, showing fill in foreground completely eliminating unsightly ravine

main business section was increased in value. The conduit has a total length of 1,760 feet and is 39 x 15 feet. It has a fall of 5 feet in its entire length, and is designed to carry 15,000 cubic feet per second.

Almost the entire length was a new cut and did not follow the creek bed, which made the construction more simple. It was built during winter months when there was but little water flowing. The C. F. Lytle Construction Company did the work. The total cost was $360,000, half of which was specially assessed in a district covering approximately one square mile.

Bridges Eliminated

At an intersection formed by West Seventh and Pearl Streets there were three bridges within 100 yards, two of which led off from each other at an angle. These three bridges, with two others, were entirely eliminated, the creek bed filled in, and the streets paved over the fill. Eighth Street had been closed at its junction with Pearl, for seventy-five years; it is now open, and extensive building is going on along it. A portion of a machine shop at the intersection of West Seventh and Pearl was removed and the street widened.

West Seventh Street traffic has increased many-fold since the removing of the narrow bridges. It was necessary to pave and improve the street for half a mile beyond the improvements. This cheaper retail section is growing in importance and value, opening up a lower-rent district for automobile business and small jobbing concerns.

In building the conduit, the ditches for the walls were dug first. Into the bottom of these, 22-foot wood piles were driven. The walls were poured and allowed to set. The dirt was then removed from the center and the concrete floor placed. Reinforced concrete slabs carried the roof on 2-foot reinforced concrete beams. Asphalt was then placed on the roof, which is used for a street throughout. The size of the tube and the concrete floor permits driving a wagon and team into the end, for removing débris when that is necessary. It is estimated that the cost of maintenance will be reduced 50 per cent in the new arrangement.

An entire block of pavement from West Sixth to West Seventh was torn up to allow for the digging of the new channel. This was then replaced and became a part of the roadway over the conduit. The route selected was along already existing streets for the most part. This was to avoid condemning private property whenever possible. Some new private property is created, or rather given back to the owner. Deeds on adjoining property cover the land to the middle of the creek bed. In some cases the city took a portion of this dry bed and used it for streets and alleys, giving the owner one dollar. In other cases, it was filled in level with the adjoining property and assessed accordingly.

THE SITE OF PERRY CREEK BEFORE AND AFTER THE CONDUIT WAS BUILT

At left.—A typical view showing the unsightly condition which will be eliminated when the second section of the conduit is completed. At right.—This street was ripped up and the first section of the conduit installed, and the street repaved, thus straightening the course of the creek and creating valuable property elsewhere without harming this section in any way

Second Section

The contract has been let and work is just starting on the second link, which will carry the creek from the outlet of the present tube to the Missouri River. The size will be the same as that of the first tube, which has under test carried more water than the old chan-

nel ever carried. It will be 1,430 feet long and will cost $450,000. One-half of this amount will be paid by special assessment, and the balance by the city through bond issue. About $85,000 of this will be spent for private land which must be purchased.

All service lines, including water, gas, and telephone conduits, are cared for in the new conduit in the 2-foot space between the roof and walls made by the beams. They are easily accessible and out of the way.

That the conduit is built for service is indicated by the fact that the roadway is designed to carry thirty 1-ton trucks at any place, and as close as possible. A portion of the roadway is a part of a transcontinental highway reaching from Boston to the Pacific coast, over which thousands of transcontinental tourists will pass annually. It is also one of the roads over which half a million hogs were hauled into Sioux City by truck last year.

Value of Improvement

From the fire protection standpoint alone, the improvement is worth the cost. Six thoroughfares between the business district proper and the west side are involved. Formerly the Fire Department had to restrict itself to certain streets because of narrow, light bridges and stub-end streets. There was considerable property that had its rear along the creek, making access impossible. In past years several serious fires have broken out in these places impossible of access.

The second section of the conduit will make front property out of considerable alley property, increasing the value of the land by thousands of dollars. In addition, it will remove some of the city's ancient eyesores, caused by an open ditch passing through a business section. It extends the newly created street to the bridge over the Missouri River, providing a new outlet for the city into its trade territory of Nebraska. Fifth Street, an important retail street, will be extended beyond the creek, where it now stops.

The length of the abandoned old channel is about 3,000 feet. About one-half of this will be used for street and alley extensions. The remainder will be added to private property. The total cost of the two projects will be $810,000. It has been estimated, however, that the property along the creek has increased in value by from five to ten million dollars. There is no question that every piece of real estate in Sioux City has increased in value by the improvement.

Improvements are rapidly being made along the finished project and along the proposed project. Old buildings have been razed and new structures are being built. The city itself took advantage of the chance to purchase a site on the west side of the conduit for a market. This property would not have been usable as a market before the improvement was made.

Plant a Tree

I

Though Adam and our Mother Eve
For stated reasons had to leave
The first arboreal reservation
And seek a gainful occupation
Somewhere outside the blissful Garden
(The forest prototype of "Arden"),
Somewhere in distant Anatolia
Or, as some think, in wild Mongolia;
Though they from Paradise were banished
And though a flaming sword was brandished
By cherubim compelling quittance.
A blazing sign of "No Admittance,"
The trees in Paradise remained,
The hope of Paradise regained.

II

So wheresoe'er there stands a tree
There is a Paradise *per se,*
Whether a pine upon the mountain,
A drooping cypress by a fountain,
A palm tree by Apollo's altar,
The tree that's sung of in the Psalter,
A whispering oak tree at Dodona,
A twisted fir-tree on Iona,
Deciduous, as Revelation's
With leaves for healing of the nations,
Of evergreen, forever vernal,
A Christmas-tree that's sempiternal.
Who plants a tree for God to grow
Enlarges Heav'n a rod or so.

—JOHN H. FINLEY.

A Water-Supply That Grows with the Town

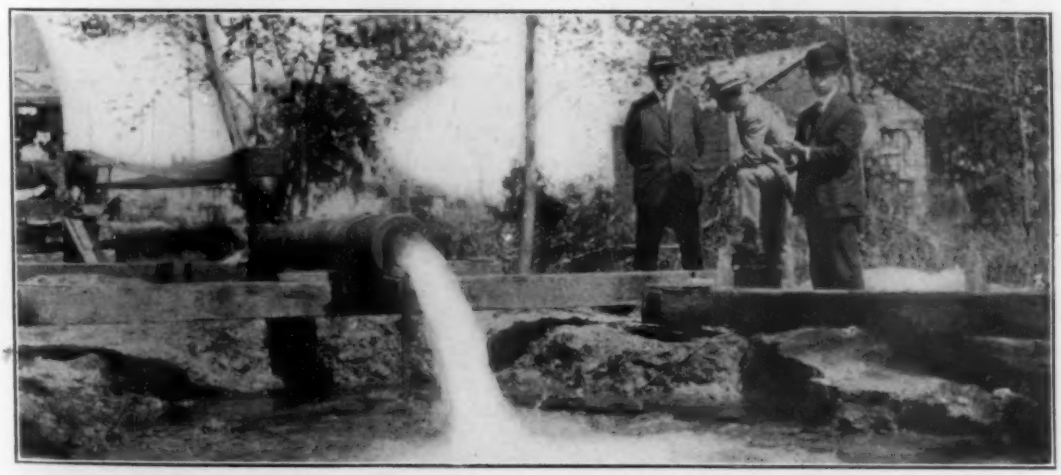
By C. J. Keily
Superintendent of Water-Works, Jamaica, L. I., N. Y.

JAMAICA, a suburb of New York City, with a population of 260,000, is situated favorably for those who work in the center of the metropolis. The transportation facilities enable them to commute easily and enjoy the benefits of life in a smaller and rural community after the day's work is done. This has led to rapid growth. Cottages, two-story residences, and family apartment houses open the way for stores and manufacturing plants. The demand for water increased 25 per cent in 1922, and during that year 5,100 new water connections were made. In 1924, 7,500 new connections were added, and in 1925, 9,700 were made. The Jamaica Water Company had to find a new way to meet the demand because of the distribution of the city's rapid growth in relation to the then existing supply points.

The water-supply had been obtained from four groups of wells, each group consisting of many shallow suction wells. Each group of wells supplied water to a low-speed, steam-driven pumping unit which pumped directly into the mains and supplied an individual center of population. As the intermediate and surrounding areas became populated and the demand for water became greater, the mains were extended from the four pumping-stations.

To increase the supply, it was apparent that the complete pumping equipment must be lowered to greater depths. In addition, it was considered necessary to install other pumping-stations and drill more wells after buying the land necessary for these additions. Roughly, one million dollars was the estimated expendi-

A WELL-DRILLING RIG WORKING ON WELL NO. 3, AT JAMAICA, L. I.



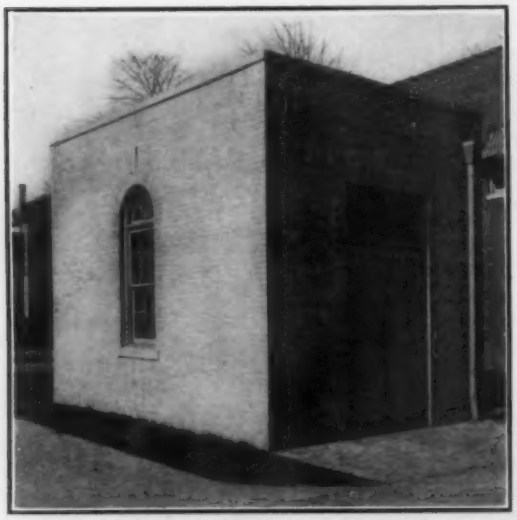
TESTING OUT WELL UNIT NO. 13

ture required to obtain the additional water-supply necessary. At this time an engineer was secured to study the situation. After a thorough hydrological survey, a proposal was made by the Layne and Bowler Company to develop the water-supply needed. The price was less than the anticipated expenditure, so a contract was awarded by which the contractor was obligated to deliver a guaranteed quantity of water at a stated pressure for a stipulated price. If he failed, the Jamaica Water Company was to be at no expense whatsoever.

The minimum amount of water guaranteed was 1,250,000 gallons daily from each of three wells, but when they were completed, it was found that 5,100,000 gallons could be pumped from the three wells combined directly into the mains at 60 pounds pressure. The wells are situated in different parts of Jamaica and therefore feed into widely separated sections of the water-mains. Not only was there abundant water, but the friction loss was greatly reduced. Each well unit can be started or stopped to correspond to the local or general demand.

Construction of the New Wells

In building up the new wells a hole of the required diameter was drilled into the ground and the earth walls sealed with clay by the rotary clay seal process, which prevents the entrance of any surface water that might otherwise get into the wells. A shutter screen of copperized steel was placed in the water-bearing formation and surrounded with an envelope or filter wall of selected gravel. A temporary pump of greater capacity than the permanent pump to be used was then lowered into the well, and the well was pumped at a high rate. Sand was thus sucked through the gravel envelope and the shutter screen while gravel was fed in from the surface to replace it. This process was continued until the gravel surrounding the screen had attained very considerable thickness, and the well yielded no more sand. When the permanent pump was placed in the well, it could not draw in any sand, as the velocity and quantity of water passing into the well was less than that attained by the development pump that was used.



A TYPICAL PUMP-HOUSE IN JAMAICA, L. I.

The Layne vertical centrifugal pumps which were installed are entirely self-contained and require but a few square feet of floor space. The pump head and motor are placed at the surface of the ground over the well. An enclosed line shaft extends down into the well inside of the discharge column and connects the pump head with the pump impellers in the pump bowls below the pumping water-level. One operator takes care of the three units. The pumps are started or shut down as demand requires. If the demand is heavy in one section of the city, the pump in that locality can take care of it without starting the other units. The great contrast between this type of pumping unit and its housing and the former pumping equipment is evident. The Layne pump consumes 1.2 kilowatt-hours to deliver 1,000 gallons of water against 60 pounds main pressure. The pump houses are well built, having architecture and materials in keeping with the requirements of the districts where they are located.

The total cost of the three original Layne units was about $100,000, while the anticipated expenditure was $1,000,000. More of these wells have been added from time to time to keep pace with the growing demand for water, until now sixteen are completed and in service and six are under construction, making available a total estimated production of 35,000,000 gallons daily coming from the thoroughly distributed sources located in various parts of the city.

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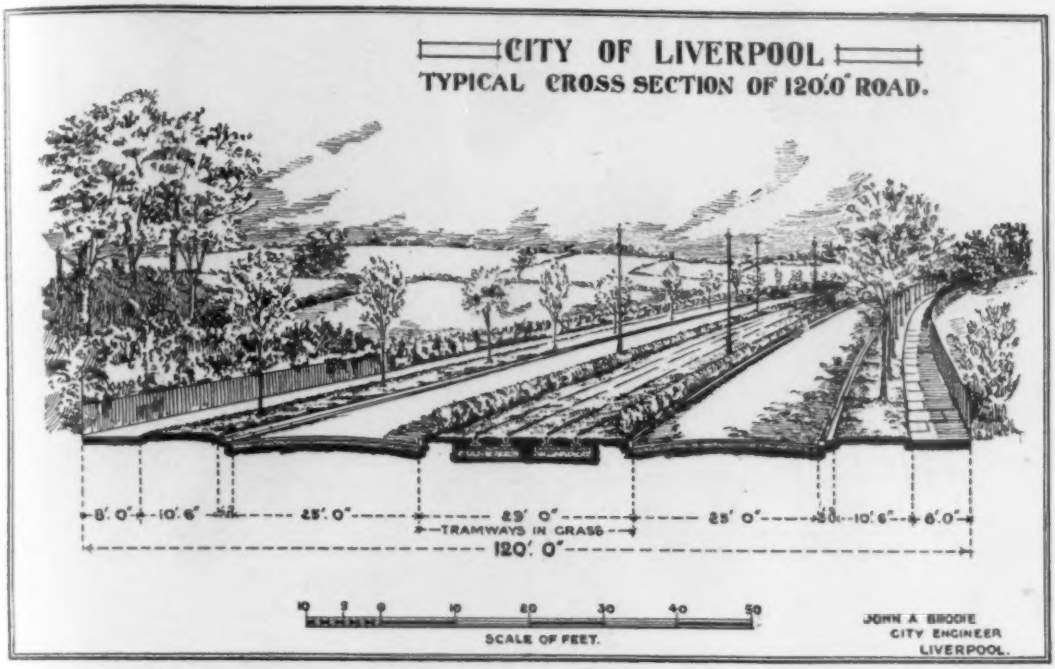


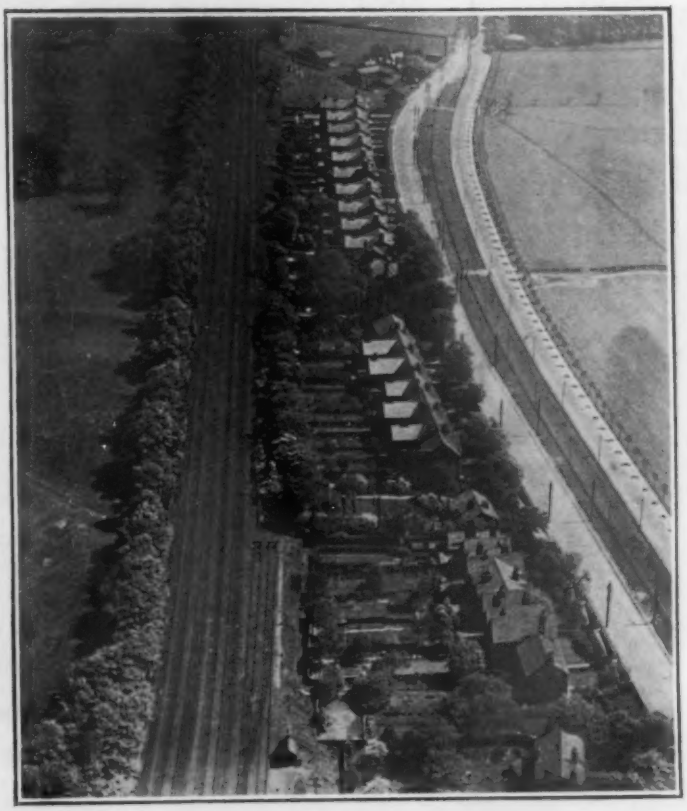
Arterial Road Development in Liverpool

By John A. Brodie

City Engineer, Liverpool, England

IN order to give improved and quickened transport for the inhabitants of Liverpool between their homes in the suburbs and their business in the central area, as well as to provide for the enormously increased industrial traffic, a co-ordinated system of radial and connecting trunk roads, 120 feet wide and suitable for tramway and general traffic at high speeds, has been devised, and over 25 miles of such roads have already been constructed or put in hand through the areas still undeveloped or only partially developed.

The underlying idea is that in the fully built-up areas, where the cost of general road widening is prohibitive, some four or five selected radial

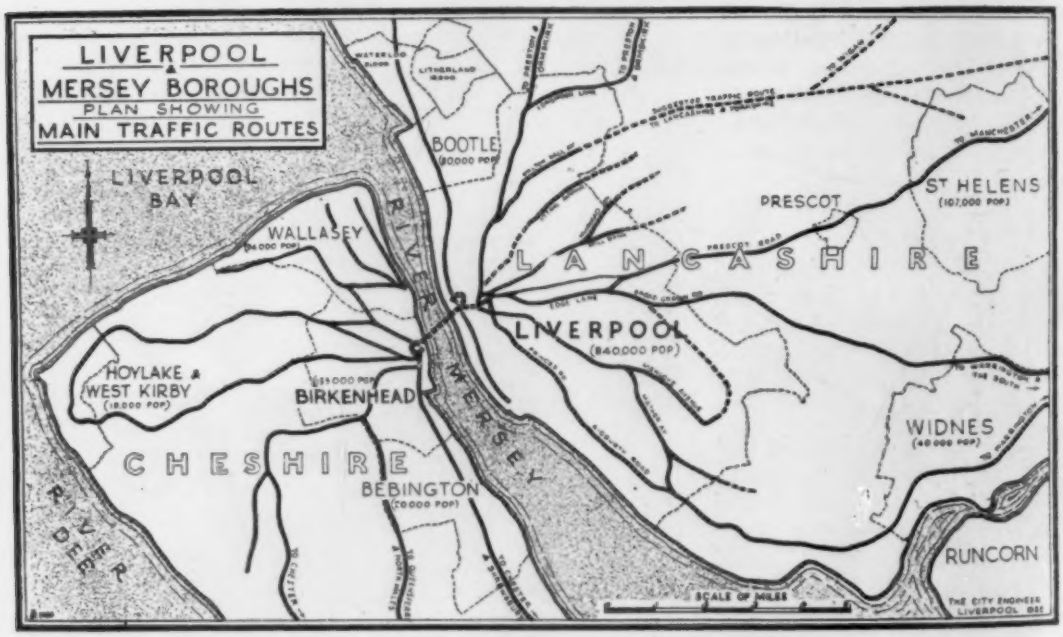


The illustration at the right shows one of the main arterial roads leading out of Liverpool—120 feet wide. This photograph and the one at the top of page 282 and the front cover illustration of this issue are copyrighted by the Central Aerophoto Co., Ltd., Kilburn, N.W.6

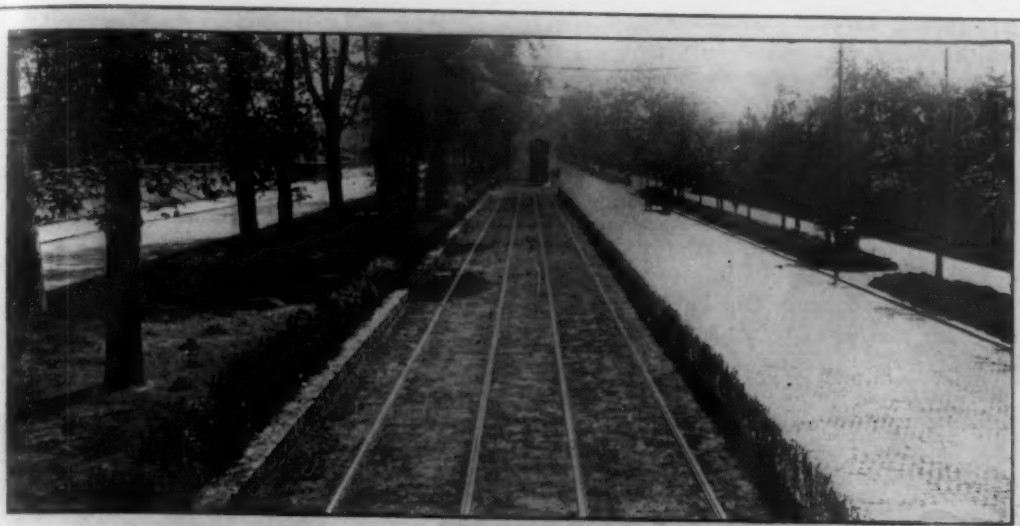
AIR VIEW OF PART OF LARK HILL ESTATE, LIVERPOOL, SHOWING MUIRHEAD AVENUE, 220 FT. WIDE

routes out of some 25 existing radial routes shall be widened to 120 feet as opportunity occurs. On reaching the limit of close development, these will branch out into a number of similar 120-foot roads spaced roughly a half-mile apart, and further out these in turn will be similarly subdivided, so as to maintain the half-mile spacing of wide radial roads as far as the city extends. Cross-connections will be provided at suitable intervals by ring-roads of similar width. The lines of existing roads are followed where these are suitably placed and available for widening at reasonable cost, and elsewhere new roads have been constructed by arrangement with the landowners or over estates already acquired by the city for housing or other purposes.

The cross-section which has been adopted as



SITE OF MERSEY TUNNEL, AND ROAD APPROACHES



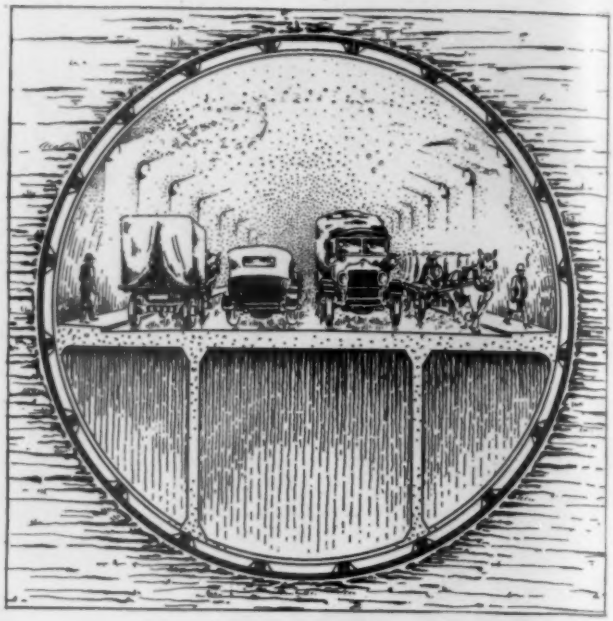
THREE OF LIVERPOOL'S MAIN TRAFFIC ROUTES, 120 FEET WIDE, WITH TRAMWAYS IN GRASS

a standard for the 120-foot road, which is now regarded in Liverpool as the minimum width for main traffic routes with a tramway service, may be briefly described as follows:

In the center of the road is a specially fenced-off track for a double tramway laid on sleepers in grass, and occupying a width of 24 feet between fences. Outside this, on either side, is a 25-foot carriageway flanked by narrow footways 2 feet wide. Ten-foot footways are provided on each side of the road, and the remainder is laid out as grass verges with trees, and will be available for the further widening of carriageways and footways when need arises.

Where old roads are widened, the cross-section has been modified somewhat to accommodate it to existing conditions, and where there are well-grown trees which it is desirable to preserve, this may be done by adding an extra width to the road.

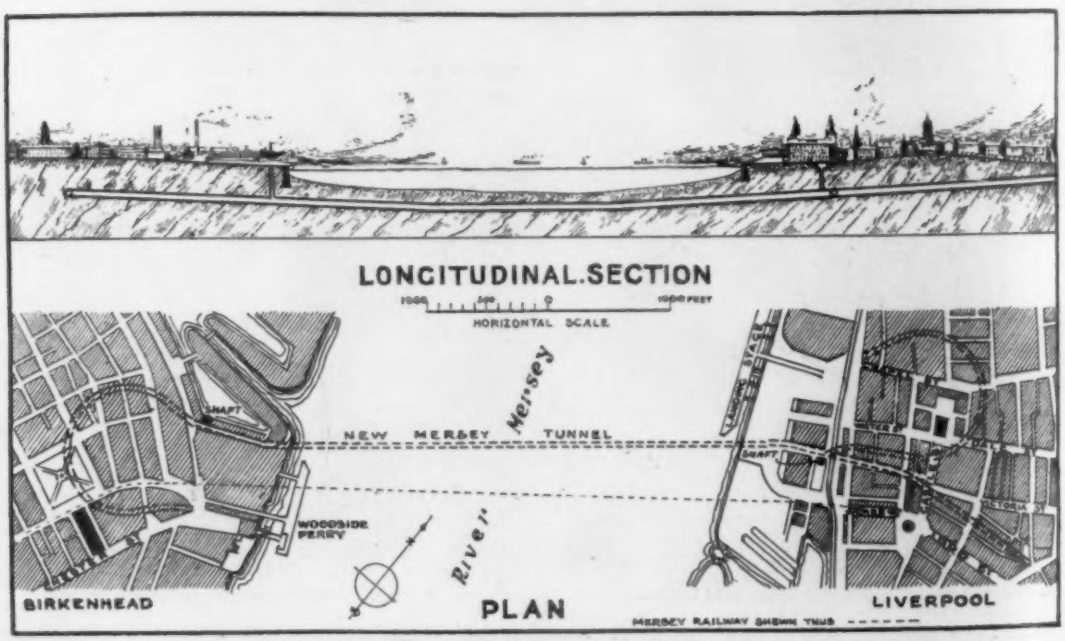
Cross-roads are provided at intervals over the tramway for the convenience of general traffic, but as far as possible these are kept a quarter of a mile apart in order to allow of high tramway speeds between stopping stations. It is intended that, after the introduction of suitable rolling stock, a speed of 30 miles an hour between stopping places shall be attainable.



CROSS-SECTION OF MERSEY TUNNEL, NOW UNDER CONSTRUCTION

The Mersey Roadway Tunnel

Parliament has authorized the construction of a tunnel for vehicular traffic under the Mersey, to be carried out jointly by the Liverpool and Birkenhead Corporations. The measure received the Royal Assent on August 7,



1925, and on December 8 a contract was let for the preliminary work of driving shafts and sinking headings. It is expected that the tunnel will be ready for public use in about five years.

The width of the river at the point of crossing is about ¾-mile, and the total length of the tunnel about 2 miles. Its internal diameter will be 44 feet, or sufficient for four streams of traffic, two in each direction, with ample spaces for ventilation purposes. The ruling gradient will be 1 to 30. The amount of materials to be excavated will be roughly one million tons, principally red sandstone rock, and the tunnel will be lined with cast iron segments throughout.

It is estimated that the tunnel will cost £5,000,000; and having regard to its importance as a national highway, the Government promised to contribute 50 per cent and to allow tolls to the extent of 25 per cent, the balance being provided by the Corporations of Liverpool and Birkenhead in proportion to their ratable value.

The tunnel when completed will link up the docks on the Lancashire and Cheshire sides of the River Mersey, and when the proposed traffic road through to the Lancashire and Yorkshire manufacturing districts is carried out, it will form an important portion of a complete scheme for the improvement of road traffic serving the Port of Liverpool.

A Law Which Provides for Community Nurses

AN ACT *providing for community nurses in certain cities, villages and incorporated towns and permitting a tax therefor; adopted by the 1925 session of the Illinois Legislature.*

Be it enacted by the People of the State of Illinois, represented in the General Assembly:

SECTION 1. The mayor of any city, village or incorporated town in the state, having a population of more than five thousand (5,000) and less than one hundred thousand (100,000) inhabitants, which has adopted this Act, shall appoint, upon the recommendation of the municipal board of health, one or more registered nurses, to be known as community nurses, who shall perform such duties as may be assigned to them by the health officer of the municipality.

§ 2. Such city may levy a tax of not more than three-tenths (3/10) mills on the dollar of assessment valuation of all property in such city to provide revenue for the salary of and expenses incident to the performance of the duties of the community nurses. Such tax shall be in addition to the maximum of taxes permitted under section 1 or Article VIII of "An Act to provide for the incorporation of cities and villages," approved April 10, 1872, as amended.

§ 3. Whenever, sixty days prior to the date of any regular election, one hundred or more legal voters of any such city, village or incorporated town, shall present a petition to the city council or board of trustees, as the case may be, asking that the question of the adoption of this Act be submitted to the voters of the municipality at such election, the city council or board of trustees shall instruct the clerk of the city, village or incorporated town to publish notice that the question will be submitted to the voters of the municipality at such election.

The question shall be submitted to the voters of the municipality at such election in substantially the following form:

For the adoption of "An Act providing for community nurses in certain cities, villages and incorporated towns and permitting a tax therefor."	YES NO

If a majority of the votes cast at such election are in favor of the adoption of this Act, it shall be adopted and be in force thereafter in such municipality.

Essential Qualities of the Site of a Public School

(From the 1925 Report of the Committee on Schoolhouse Planning of the National Education Association.)

1. *Adequate Size*
   - (a) For the building and its future extensions
   - (b) For the proper setting of the building and its removal from the noise and dust of the street
   - (c) For outdoor games and physical education
   - (d) For school gardens, if desired

2. *Orientation of Building.*—Most classrooms should have sunlight part of the day. This result is obtained most readily if the site permits the long axis of the building to extend approximately north and south.

3. *Freedom from Noise and Odors.*—Avoid proximity to railroads, gas plants, factories, and other sources of injurious noise and odors.

4. *Suitability for Construction.*—Avoid low, filled, and wet land. Avoid abrupt changes in grade unless the building can be readily adapted to them. Ledge rocks may increase cost of foundation.

5. *Safety.*—Elementary schools especially should not be located on dangerous thoroughfares.

6. *Healthfulness.*—Abundance of fresh air and sunlight, and freedom from noise, dust, and odors are conducive to health.

7. *Reasonable Centrality to Contributing Area.*—Exact centrality is not as important as other factors.

8. *Reasonable Accessibility.*—When many children must come by railroad or trolley, the school should not be too far distant from them.

A City Engineer's Observations in Europe

By M. M. O'Shaughnessy
City Engineer, San Francisco

IN Ireland I spent a week, during which there was opportunity to examine the road reconstruction and bridge repair work going on after the late wars. The country is recovering its prosperity. The Government is functioning with character, and incompetent local councils of Cork and Dublin have been removed and city managers appointed as substitutes. The Shannon power scheme was much talked of, and a contract has been made with Messrs. Siemens & Schuckert, a German firm, for the first installation, amounting to $12,500,000. The work consists of building a canal and a low-head plant with about 70-foot fall near the city of Limerick, which would generate about 250,000,000 kilowatt-hours yearly. This is only 60 per cent of the volume of the recently completed Hetch Hetchy plant for San Francisco.

* * *

The most interesting feature about the underground railways in London is that the cars just clear the tunnels with a safety-clearance of only 6 or 8 inches. Thus, each car moving acts as a plunger to remove the foul air from the tunnel, which is released at the stations, and thereby keeps the tunnel always renewed with fresh air. This is a better system of circulation than that employed in New York, where the cars travel between stations in large-sized, double-track tunnels, with a constant diffusion of foul air.

* * *

The greatest philanthropist Paris has ever had was Baron Hausmann, who, between 1862 and 1868, cut through about 40 miles of new avenues running in diagonals and along the main arteries, thus making Paris the model traffic city of the world. At the same time slums were broken up and private real estate acquired for the buildings of uniform height and architectural style which front on those streets.

Nearly all the old pavements in Paris are of hard sandstone blocks 7½ inches square, well and neatly laid. Some of those pavements at Versailles have been down for 200 years and are in good condition. All the heavy modern pavements, like those in London, have a base of 12 to 16 inches of good concrete, capped by a surface of wood blocks 5½ inches square. On some of the minor streets sandstone is substituted for wood blocks, laid very neatly in annular rings. The pavements are kept very clean. Suppressed hydrants are under the sidewalk, and every morning they are opened and the street flushed down into the adjacent gutters, by individual men with short pieces of hose stationed at the hydrants. Long-handled brooms made of twigs constitute the cleaning equipment, although on the main thoroughfares there is modern machinery and equipment for washing and cleaning the streets. On account of the masses of concrete and stone pavements and concrete slabbed arcades, Paris is the noisiest place by night of any city I ever visited. All electric ducts are under the sidewalks in flexible cables, and the manner in which trenches are uptorn, cables relaid and repaired, with muck obstructing the entrances to the stores for days, would cause a vigorous kick from our American storekeepers and tenants along Grant Avenue to Market Street in San Francisco, who express so much emotion every time a trench is cut in the street remote from the sidewalk.

* * *

Every available piece of land in Switzerland is put to use. In places there are ten miles long of continuous bulkheads and terraces which sustain garden patches, where vines and plants are grown. Of the 2,882 kilometers of Swiss Federal railways, 800 are now

Europe From a Californian's View-point

From an unpublished volume of about 300 pages, descriptive of a European trip from which he has recently returned, City Engineer O'Shaughnessy has prepared a synopsis from which the accompanying paragraphs have been selected as of special interest to readers of The American City.

All who admire the enthusiasm of a loyal Californian for his home state and city will read with pleasure the comparisons of national scenery and public works in Ireland, France, Switzerland, and Italy with those of California and San Francisco.

converted to electrical use, including the Simplon and St. Gotthard tunnel line. Swiss railway authorities hope to have in 1928 1,500 kilometers converted to electric use. Switzerland is very rapidly developing hydroelectric energy and in a short time will have surplus to sell to Germany, France, and Italy. The country around Lake Geneva is very like the high Sierra country in California, with mountains of 3,000 to 5,000 feet altitude climbing up from the lake level, and crests covered with timber and rock.

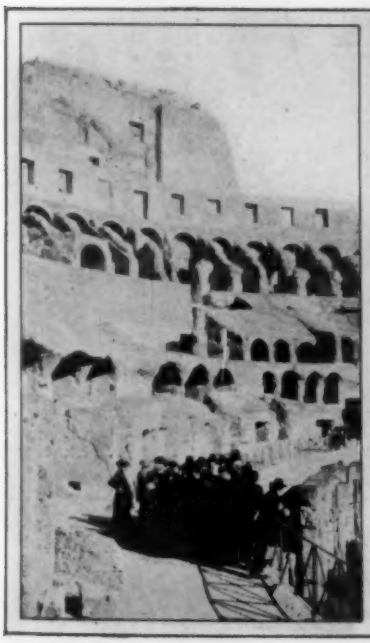
* * *

In Rome, with an Italian engineer, I examined ancient aqueducts, built over 2,000 years ago. Those are all carried on uniform grade lines from the hills to the point of use in the city. Those grade lines are sustained by building substantial arches of dry stone work about 10 to 12 feet long and from 40 to 100 feet in height. The stone is laid dry on 28-inch courses and is in just as good condition to-day as the day the aqueducts were built. Most of the arches are 17- to 20-foot span, and above the crown of the arches the aqueduct was built to carry the water. In some cases the smaller aqueduct of brick and tile was built on the crest of the main aqueduct, so that a double line of conduits is carried over the same line of piers. In ancient Rome there were nine of those aqueducts that brought water from different directions into the city. The present city is supplied from three of the restored aqueducts and substantial pressure pipes.

The Coliseum is a wonderful structure, almost on a parity with the Stadium of the University of California, which seats about 75,000. The stalls are all numbered on the outside above the arches of Travertine rock.

* * *

Pompeii is ten kilometers southeast of the crest of Vesuvius and about the same distance from Naples. The crest of Vesuvius is covered with a constant cloud of steam from the burning volcano. Intermittently for a period of years it has spouted lava. The flow of A.D. 69 threw a deposit of about 20 or 25 feet of ashes over the town of Pompeii. This was done so suddenly that most of the inhabitants did not get time to escape, and skeletons and mummies show the physical condition of the natives who were poisoned with carbonic acid gas. Utensils for cooking, even eggs, raisins, olives, vegetables, and foods of pretty nearly every description are preserved as exhibits of what the people used in those times. Practically 160 acres of the city have been uncovered by the Italian Government. The main street leads through a tunnel 25 feet wide, 25 feet high, and 150 feet long, making an entry into the city, which is cross-sectioned the same as any of our American modern cities, with a series of narrow streets. Some of them are only 13 feet wide. The streets are all paved with large-sized irregular basalt blocks, so that the stone pavers' union in Italy may claim to be 2,000 years old. The most interesting exhibits are the ruts in the pavements worn by the chariot



ANCIENT AQUEDUCT, ROME

COLISEUM, ROME

12-FOOT ALLEY, POMPEII

wheels from 3 to 4 inches deep into the rock, and the traffic stops of large rocks near the civic center to keep the noise of chariots removed from the political orators of those days. The water pipes were of lead, about 2 inches in diameter, laid under the narrow sidewalks, which were about 2½ feet wide, like the present Parisian and Roman practice. At street corners water-tanks show six outlet pipes leading through the wall and down to the sidewalk, where they pass through a gate-box with bronze valves.

* * *

I was very glad to get aboard an American ship, the Dollar steamer "President Harrison," at Naples, and glad to be on the way home to San Francisco.

Salaries of Councilmen, Mayors, City Clerks, and City Engineers

THE following table has been compiled by THE AMERICAN CITY from data recently published by the Bureau of the Census of the Department of Commerce in the volume entitled "Financial Statistics of Cities Having a Population of Over 30,000: 1923." Although the figures given are for the fiscal year 1923, the time consumed in securing, compiling, and printing financial reports from 248 cities prevented publication by the Census Bureau until the fall of 1925. For most cities the salaries stated are, no doubt, still in force, though changes have, of course, been made in some cases, including Cleveland and other municipalities which have adopted the commission-manager form since the figures were furnished to the Census Bureau. As salary data are not being included in the financial statistics of cities for 1924, now being compiled by the Census Bureau, the accompanying table is published with the request that any changes in salaries made since 1923 for the positions listed be reported to THE AMERICAN CITY for publication in an early issue of this magazine.

The grouping of the 248 cities in order of size is based on the Census Bureau's estimates of population of each city as of the middle of the fiscal year reported.

In the report from which the table has been compiled the following explanations are given in regard to the designations "City Clerk" and "City Engineer":

City Clerk.—In the column under the heading "City Clerk" are included data pertaining only to such officials with this designation as perform duties other than those of clerk of council or other legislative body.

City Engineer.—The data shown in the column headed "City Engineer" are for most cities those of employees whose official designation is *city engineer.* In some instances, however, the salaries reported are those of officials with other designations, but who exercise the functions of city engineer.

City and State	Aldermen, Councilmen, or Commissioners	Mayor or Presiding Officer	City Clerk	City Engineer
GROUP I. CITIES HAVING A POPULATION OF 500,000 AND OVER				
New York, N. Y.	$5,000	$25,000	$10,000	.....
Chicago, Ill.	5,000	18,000	8,000	$8,000
Philadelphia, Pa.	4,000	15,000	.....	12,000
Detroit, Mich.	5,000	8,000	5,000	8,000
Cleveland, Ohio	2,100	10,000	5,000	5,800
St. Louis, Mo.	1,800	10,000	4,000	8,000
Baltimore, Md.	1,500	10,000	.....	7,000
Boston, Mass.	1,500	10,000	6,000	9,000
Los Angeles, Cal.	2,400	8,000	3,600	7,500
Pittsburgh, Pa.	6,500	10,000	.....	6,500
San Francisco, Cal.	2,400	6,000	.....	15,000
Buffalo, N. Y.*	7,000	8,000	3,600	6,000
GROUP II. CITIES HAVING A POPULATION OF 300,000 TO 500,000				
Milwaukee, Wis.	1,860	6,800	3,600	5,000
Washington, D. C.*	5,000	5,000	.....	.....
Newark, N. J.*	7,500	8,250	7,000	6,000
Minneapolis, Minn.	1,800	6,000	4,740	7,500
Cincinnati, Ohio	1,150	10,000	.....	6,000
New Orleans, La.*	6,000	10,000	.....	5,000
Kansas City, Mo.	(i)5	5,700	3,600	4,800
Indianapolis, Ind.	600	7,500	3,000	8,500
Rochester, N. Y.	750	7,500	3,300	5,680
Seattle, Wash.	3,000	7,500	(g)	6,000
Jersey City, N. J.*	7,500	8,000	6,500	6,000
GROUP III. CITIES HAVING A POPULATION OF 100,000 TO 300,000				
Portland, Ore.*	5,000	6,000	.....	6,500
Denver, Colo.	100	6,000	2,500	4,000
Toledo, Ohio	660	7,500	4,000	3,600
Columbus, Ohio	1,200	5,000	2,880	4,000
Louisville, Ky.	None	5,000	.....	4,000
Providence, R. I.	500 & 750	6,500	5,000	5,500
St. Paul, Minn.*	4,500	5,000	3,000	5,000
Oakland, Calif.*	3,600	4,200	.....	5,500
Atlanta, Ga.	300	6,000	3,300	4,000
Akron, Ohio	1,000	7,000	2,100	5,000
Omaha, Nebr.*	4,500	5,000	3,600	4,800
Birmingham, Ala.*	5,000	6,000	3,000	5,000
Worcester, Mass.	None	5,000	3,400	5,000
Syracuse, N. Y.	750	6,500	3,200	6,000
Richmond, Va.	150	8,000	4,000	7,500
San Antonio, Tex.*	4,000	5,000	3,000	3,600
Dallas, Tex.*	3,000	4,000	3,600	5,000
New Haven, Conn.	None	7,500	2,640	4,000
Memphis, Tenn.*	4,800	6,000	4,000	6,000
Dayton, Ohio†	1,200	1,500	2,700	3,000
Norfolk, Va.†	1,200	1,800	4,600	7,500
Houston, Tex.†	3,600	7,500	.....	5,000
Youngstown, Ohio	450	6,000	.....	3,540
Grand Rapids, Mich.†	1,200	1,500	3,000	3,600
Springfield, Mass.	None	6,000	3,900	5,500
Bridgeport, Conn.	None	6,000	4,000	5,000
Fort Worth, Tex.*	3,000	3,600	2,500	3,000
Scranton, Pa.	3,000	5,000	2,400	2,700
Paterson, N. J.	500	4,200	2,200	3,500
Hartford, Conn.	None	5,000	5,500	6,000
Des Moines, Iowa*	3,000	3,500	2,820	4,000
New Bedford, Mass.	100	7,500	3,800	4,000
Trenton, N. J.*	4,500	5,250	2,000	2,700
Salt Lake City, Utah*	3,600	4,200	2,700	4,200
Camden, N. J.*	4,500	5,000	4,000	.....
Nashville, Tenn.	240	6,000	3,000	32,50

Note.—For explanation of symbols, see end of table.

City and State	Aldermen, Councilmen, or Commissioners	Mayor or Presiding Officer	City Clerk	City Engineer
Fall River, Mass.	400	6,000	4,200	4,850
Albany, N. Y.	750	6,500	3,000	5,000
Wilmington, Del.	500	2,000	2,520	3,600
Kansas City, Kans.*	3,000–4,500	4,500	1,500	3,000
Lowell, Mass.	500	5,000	2,800	4,200
Flint, Mich.	500	2,500	3,600	7,000
Erie, Pa.*	3,000	3,500	2,860	3,460
Cambridge, Mass.	500	5,000	3,800	3,500
Reading, Pa.*	3,000	3,500	2,400	3,600
Yonkers, N. Y.	1,500	6,500	4,000	6,000
Duluth, Minn.*	4,000	4,000	2,800	4,000
Spokane, Wash.*	3,600	3,600	3,036	5,000
Elizabeth, N. J.	1	4,000	3,500	4,000
Utica, N. Y.	750	6,500	3,600	6,000
Lynn, Mass.	500	3,500	3,200	2,750
Tacoma, Wash.*	3,600	4,000	2,220	3,300
Jacksonville, Fla.	240	5,000	4,000	4,200
Group IV. Cities Having a Population of 50,000 to 100,000				
Oklahoma City, Okla.*	3,600	4,000	3,000	3,900
Canton, Ohio	350	4,000	.....	2,625
Somerville, Mass.	None	4,000	3,800	4,000
Schenectady, N. Y.	500	6,000	3,000	4,500
Waterbury, Conn.	None	6,000	4,000	12,000
Tulsa, Okla.*	3,600	4,800	.....	5,000
Lawrence, Mass.*	2,500	3,500	2,750	2,900
Fort Wayne, Ind.	400	5,000	2,400	3,000
El Paso, Tex.	2,400	4,800	3,000	4,200
Evansville, Ind.	400	5,000	2,400	3,000
Savannah, Ga.	260	5,000	.....	3,300
Knoxville, Tenn.*	3,000	3,500	.....	2,700
Allentown, Pa.*	3,000	3,500	2,000	3,500
San Diego, Calif.†	2,000	4,400	3,000	(a)
Bayonne, N. J.*	3,000	3,750	4,500	3,250
Manchester, N. H.	200	3,000	3,000	5,000
Harrisburg, Pa.*	3,000	3,500	2,100	3,000
Peoria, Ill.	500	6,000	2,600	3,000
Wichita, Kans.†	100	100	2,400	4,000
St. Joseph, Mo.	300	3,600	1,800	3,600
Sioux City, Iowa*	3,000	3,500	2,100	2,400
South Bend, Ind.	400	5,000	.....	3,000
Wilkes-Barre, Pa.*	3,000	3,500	3,000	3,000
Binghamton, N. Y.	500	5,500	2,650	4,000
Portland, Me.	None	4,000	3,000	.....
Rockford, Ill.	(i) 10	3,750	3,600	3,000
Troy, N. Y.	500	4,000	1,800	4,000
Charleston, S. C.	None	3,500	.....	6,000
Little Rock, Ark.	480	5,000	2,400	3,600
Johnstown, Pa.*	2,500	3,000	1,975	3,300
Sacramento, Calif.†	300	300	.....	7,200
East St. Louis, Ill.*	4,000	4,500	1,800	2,500
Brockton, Mass.*	None	4,000	2,750	3,000
Terre Haute, Ind.	400	5,000	2,400	3,000
Saginaw, Mich.*	3,000	3,500	.....	5,000
Gary, Ind.	400	7,000	.....	4,000
Pawtucket, R. I.	200 & 300	2,000	3,750	3,750
Hoboken, N. J.*	4,500	5,000	6,000	.....
Long Beach, Calif.†	(i) 10	(i) 10	4,200	4,200
Passaic, N. J.*	3,000	3,750	4,000	3,600
Springfield, Ohio†	500	500	(f)	3,000
Chester, Pa.*	2,000	2,500	1,600	3,600
Hamtramck, Mich.	3,500	5,000	3,500	Receives Commission
Altoona, Pa.*	2,500	3,000	1,200	3,000
Racine, Wis.	600	1,500	2,400	3,600
Lansing, Mich.	400	2,000	2,400	3,800
New Britain, Conn.	None	2,500	3,000	3,500
Mobile, Ala.*	6,000	6,000	2,700	3,300
Berkeley, Calif.*	1,800	2,400	2,400	3,600
Springfield, Ill.*	3,500	4,000	1,200c	2,100
Holyoke, Mass.	None	3,500	3,250	3,000
Highland Park, Mich.*	1,000	2,000	3,750	5,000
Davenport, Iowa	600	2,500	3,000	3,300
Chattanooga, Tenn.*	2,250	3,000	.....	3,000
Bethlehem, Pa.*	2,000–2,500	2,500	2,200	3,600
Lincoln, Nebr.*	2,000	2,500	(d)	4,000
Niagara Falls, N. Y.†	1,000	1,000	3,300	4,500
Covington, Ky.*	3,000	3,600	2,400	2,500
Haverhill, Mass.*	1,800	2,500	2,700	2,400
Portsmouth, Va.†	600	600	(d)	.....
Huntington, W. Va.*	5,000	6,000	2,100	2,400
East Orange, N. J.	500	4,000	3,200	4,200
Macon, Ga.	300	3,000	.....	2,700
Wheeling, W. Va.†	(i) 5	(i) 6	.....	3,000
Cicero, Ill.	240	2,000	2,000	Receives Fees
Roanoke, Va.†	1,000	1,200	3,000	3,000
Tampa, Fla.†	1,200	1,800	2,400	4,800
Lancaster, Pa.	None	3,000	1,440	2,400
Winston-Salem, N. C.	None	2,000	.....	3,000
Shreveport, La.*	3,600	4,000	.....	4,000
Jackson, Mich.†	500	750	3,000	3,500
Augusta, Ga.	300	5,000	2,400	3,000
Fresno, Calif.*	5,000	6,000	2,400	.....
Quincy, Mass.	500	4,000	2,500	2,750
Pasadena, Calif.†	(i) 10	(i) 10	2,580	5,400
Topeka, Kans.*	2,500	3,000	1,800	2,800
Atlantic City, N. J.*	4,500	6,000	4,000	5,000
Kalamazoo, Mich.†	360	500	.....	4,200
Lakewood, Ohio	600	6,000	(d)	5,000
Malden, Mass.	None	2,000	2,500	2,700
Charlotte, N. C.*	4,250	4,500	2,100	4,000
Group V. Cities Having a Population of 30,000 to 50,000				
Cedar Rapids, Iowa*	2,500	3,000	3,000	3,000
Wichita Falls, Tex.*	1,200	3,600	3,000	3,600
York, Pa.*	2,500	3,500	2,100	2,100
Elmira, N. Y.	200	3,000	3,000	3,300
Newton, Mass.	None	3,000	4,150	4,000
Bay City, Mich.†	500	500	.....	2,000
McKeesport, Pa.*	2,000	2,500	1,860	2,700
New Castle, Pa.*	2,000	2,500	1,800	3,600
Decatur, Ill.*	3,000	3,500	2,280	3,600
Oak Park, Ill.	(b)	(b)	3,500	.....
Chelsea, Mass.	500	1,500	2,500	2,500
Kenosha, Wis.†	None	.....	(h)	3,000
Hammond, Ind.	200	4,000	.....	3,000
Galveston, Tex.*	1,200	2,000	.....	2,400
Mt. Vernon, N. Y.	700	6,000	2,500	3,000
Beaumont, Tex.†	None	800	3,600	4,000
Woonsocket, R. I.	200	1,800	3,200	2,800
Pittsfield, Mass.	None	1,800	2,000	3,600
Perth Amboy, N. J.	500	3,000	3,000	3,600
Montgomery, Ala.*	3,600	4,500	3,000	2,400
Stockton, Calif.†	(i) 5	(i) 5	3,600	4,800
Medford, Mass.	None	3,000	2,900	2,750
Lima, Ohio†	600	600	2,500	2,700
Charleston, W. Va.†	(j) 2.50	4,500	2,400	3,400
Lexington, Ky.*	3,000	3,600	2,000	2,400
Greensboro, N. C.†	200	840	3,000	3,000
Pueblo, Colo.*	2,700	2,700	2,280	3,200
Salem, Mass.	500	3,000	2,400	3,000
Madison, Wis.	300	2,000	2,400	5,500
Everett, Mass.	200–400	3,000	1,650	2,700
Butte, Mont.	360	4,000	2,400	3,000
Fitchburg, Mass.	400	3,000	2,400	(e)
East Chicago, Ind.	200	4,000	.....	.....
San Jose, Calif.†	(i) 5	(i) 5	2,160	2,700
Williamsport, Pa.*	2,000	2,500	1,440	2,400
West Hoboken, N. J.	500	1,000	3,000	Receives Commission
Evanston, Ill.	(i) 10	4,000	1,800	.....
Hamilton, Ohio	150	3,600	1,400	3,228
Brookline, Mass.*	1,500	2,500	3,300	4,500
Jamestown, N. Y.	300	2,500	1,900	3,000
Springfield, Mo.*	1,800	2,400	1,920	2,100
Waco, Tex.*	1,000	2,400	2,400	2,400
Muskegon, Mich.†	400	500	1,600	3,500
Lorain, Ohio	150	3,000	(d)	3,600
Muncie, Ind.	200	3,000	2,000	3,000
Pontiac, Mich.†	300	300	3,000	5,000
Chicopee, Mass.	None	2,000	1,380	3,250
Joliet, Ill.*	3,500	4,000	2,400	2,846
Columbia, S. C.*	2,000	2,500	(f)	4,800
Superior, Wis.	4,500	5,000	2,216	2,716
Dubuque, Iowa†	None	.....	1,800	2,700
Battle Creek, Mich.*	300	500	2,400	2,400
Aurora, Ill.*	3,000	3,500	3,000	3,000
Waterloo, Iowa	250	3,600	(d)	3,200
New Rochelle, N. Y.	1,000	5,000	3,000	3,240
Stamford, Conn.	300	1,500	4,500	5,000
Taunton, Mass.	500	3,500	2,800	2,000
Council Bluffs, Ia.	250	2,400	2,100	3,000
Portsmouth, Ohio	125	1,800	(d)	3,978
Rock Island, Ill.*	2,000	2,500	.....	1,680
Poughkeepsie, N. Y.	300	1,000	2,500	3,600
Quincy, Ill.	(i) 5	3,000	2,000	3,600
Austin, Tex.*	2,000	2,500	2,200	2,700
Auburn, N. Y.†	750	750	2,700	3,500
New Brunswick, N. J.*	2,250	2,700	3,000	3,000
Easton, Pa.*	1,800	2,000	2,000	2,500
Newport News, Va.†	(j) 900	(j) 1,200	3,000	2,100
Danville, Ill.	2,500	2,500	1,800	3,000
Ogden, Utah*	3,600	4,200	2,100	3,600
Wilmington, N. C.*	4,500	5,000	(f)	3,000
Hazleton, Pa.*	1,200	1,200	1,680	2,160
Orange, N. J.*	1,500	1,800	2,600	2,312
Kokomo, Ind.	150	2,000	2,220	1,800
Amsterdam, N. Y.	300	2,000	2,000	2,500
Petersburg, Va.†	400	500	.....	3,600
Pensacola, Fla.*	3,600	3,600	2,500	2,500
Norristown, Pa.	None	700	1,800	2,700

For explanation of symbols, see end of table.

City and State	Aldermen, Councilmen, or Commissioners	Mayor or Presiding Officer	City Clerk	City Engineer
Lewiston, Me.	None	2,200	1,800	500
Oshkosh, Wis.	3,500	4,000	2,400	3,000
Green Bay, Wis.*	3,500	4,000	2,300	3,000
Columbus, Ga.†	1,200	1,200	.....	3,600
Watertown, N. Y.†	750	750	1650	3,600
Moline, Ill.	(i) 5	2,500	2,000	2,500
Sheboygan, Wis.	300–450	840	.....	2,400
Waltham, Mass.	500	5,000	2,500	3,600
Newport, R. I.	1,000	2,500	3,100	1,400
Muskogee, Okla.†	None	None	2,500	2,400
Newburgh, N. Y.†	750	750	2,500	.....
LaCrosse, Wis.	200	1,000	2,150	3,000
Lynchburg, Va.†	500	750	.....	3,000
Colorado Springs, Colo.	None	None	2,400	4,200

EXPLANATION OF SYMBOLS USED IN THE FOREGOING TABLE

(a) City Manager acts as engineer.

(b) Six village trustees, elected by wards, and the village president, all elected for two years, serve without pay.

(c) Receives $720 additional as secretary of Oak Ridge Cemetery Board, and certain license fees.

(d) Auditor acts as city clerk.

(e) Commissioner of public works is city engineer ex officio.

(f) Treasurer acts as city clerk.

(g) Comptroller acts as city clerk.

(h) The director of finance, appointed by the city manager at a salary of $3,600, is in charge.

(i) Per meeting.

(j) Plus $10 for each weekly meeting attended.

* Commission form of government.

† Commission-manager form of government.

None.—Where this word is inserted, the incumbent receives no salary

Strips Designating Four Lanes Help to Speed Up California Traffic

IN an effort to bring about a more efficient use by traffic of the 36-foot pavement on a portion of the Peninsula State Highway immediately adjacent to the city of San Mateo, Calif., three traffic strips have been painted longitudinally on the pavement in the following manner:

One strip 4½ inches wide was painted down the center line of the pavement, and two additional strips, with 9 feet 6 inches clearance, on either side of the center line strip. All three strips were painted on the asphalt concrete surface, which is slightly over 20 feet wide, leaving the two 8-foot strips of bare concrete shoulder on either side of the old pavement, or a total of 8 feet 6 inches outside of the traffic strip. The widths are, therefore: outside strips, 8 feet 6 inches; and the two center lanes, 9 feet 6 inches.

Slow-moving traffic is expected to confine itself to the outside lanes, leaving the central two lanes for the fast automobile traffic going in either direction. Local and state traffic officers have promised to assist in directing traffic in accordance with this plan.

For the photograph here reproduced, THE AMERICAN CITY is indebted to Frank B. Durkee, editor of *California Highways*, and to John H. Skeggs, Engineer of Division IV of the California Highway Commission.

Sickness Costs $2,000,000,000 a Year

"MUCH of the increase in our national wealth has resulted from the added years of life and vigor which are now available to us for productive work because of the better hygienic and sanitary conditions under which we live," writes Dr. Louis I. Dublin, statistician of the Metropolitan Life Insurance Company, in the *Survey Graphic* for November in an article entitled "Health Work Pays." Dr. Dublin estimates that the cost of sickness in this country in terms of lost production and medical care is not less than two billions of dollars a year. Much of this sickness could be prevented. In fifteen years the Metropolitan Life Insurance Company invested $18,000,000 in a public health campaign for its policyholders, and so saved $5,000,000 in expected payments on policies. "A balance sheet," Dr. Dublin continues, "would show the enormous disparity between the value of the results achieved by public health work and the cost of the service in the past." Such conclusions are of great importance to municipalities.

NIGHT SCENE IN SOUTH BEND WHEN FIVE-LIGHT CLUSTERS WERE USED

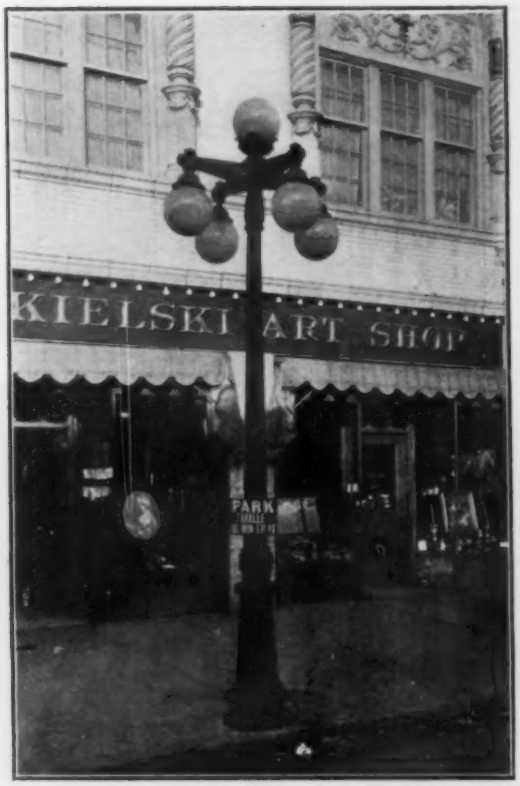
Street Lighting in South Bend, Ind.

By Eli F. Seebirt
Mayor of South Bend

STREET lighting is being given serious study by the officers of every progressive city. The aim is to furnish efficient light to make the streets safe, to show off the buildings and store windows of merchants, and to give an attractiveness to the streets. Correct conclusion as to the best type of installation can be formed only by seeing a system in actual use.

South Bend, Ind., presents to-day a very well lighted business district. Until last year the business district was lighted with cluster lights, five on a pole, with a combined wattage of 340 to the cluster. The contract with the lighting and power company expired in 1924 and the city negotiated a new ten-year contract seeking the best possible lighting equipment. A lighting engineer was employed and inspection of installations in other cities was made.

NIGHT SCENE IN SOUTH BEND AFTER SINGLE-LIGHT STANDARDS WERE INSTALLED

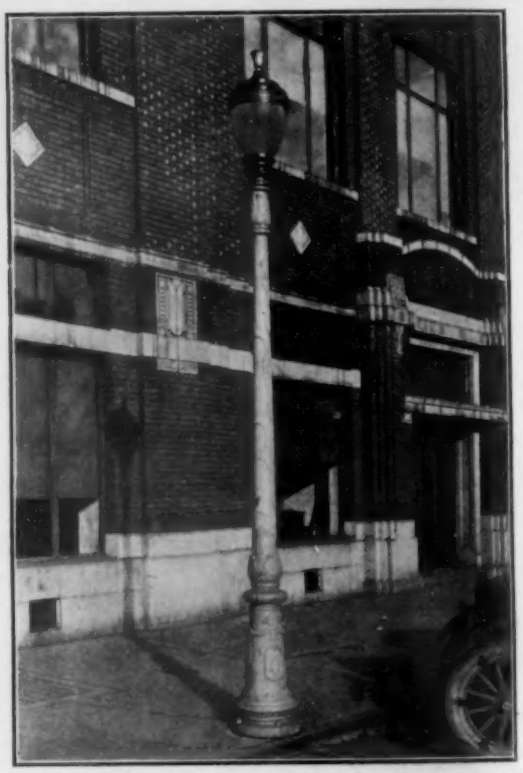


ONE OF THE FIVE-LIGHT CLUSTERS

The most modern types of lights manufactured by the Westinghouse Electric & Manufacturing Company were installed. South Bend now has in its business district an efficient and beautiful system of lights consisting of 7,000-lumen incandescent lamps, Egyptian Senior opalescent units, mounted on iron posts about 12 feet high, placed so that there are from ten to twelve lamps in each city block. A block is from 344 feet to 410 feet in length.

The lamps have demonstrated that they throw a much brighter light per unit than was obtained from five of the old lamps formerly in use, and that they throw the light, not upward, but outward into the street, and into store windows and onto the sides of buildings. They place the light where it is needed. There are 84,000 lumens provided to light one block, which is a greater quantity than that provided in most cities. But while more light was obtained than under the old system, it was found that it could be supplied cheaper, as the maintenance, repair, and cleaning of one lamp instead of five effected a large saving in cost.

On the boulevards there were installed incandescent lamps of 1,000 to 2,500 lumens, with octagonal tops and refractors, mounted on iron posts. All old arc lamps are to be removed from the remainder of the residence district before January 1, 1927, and are to be replaced by 6,000-lumen incandescent lamps with pendent fixtures and dust-proof bowl refractors, which will greatly improve the intensity of lighting. The cost of lighting in South Bend is about $1.10 per capita, based on the census of 1920; and upon the present actual population it is about $1.00 per capita.

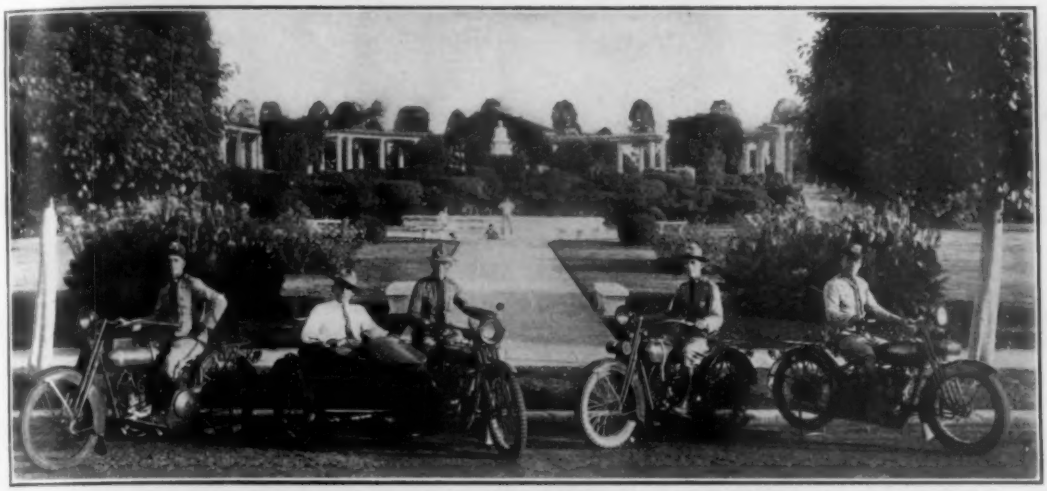


ONE OF THE NEW SINGLE-LIGHT ORNAMENTAL STANDARDS

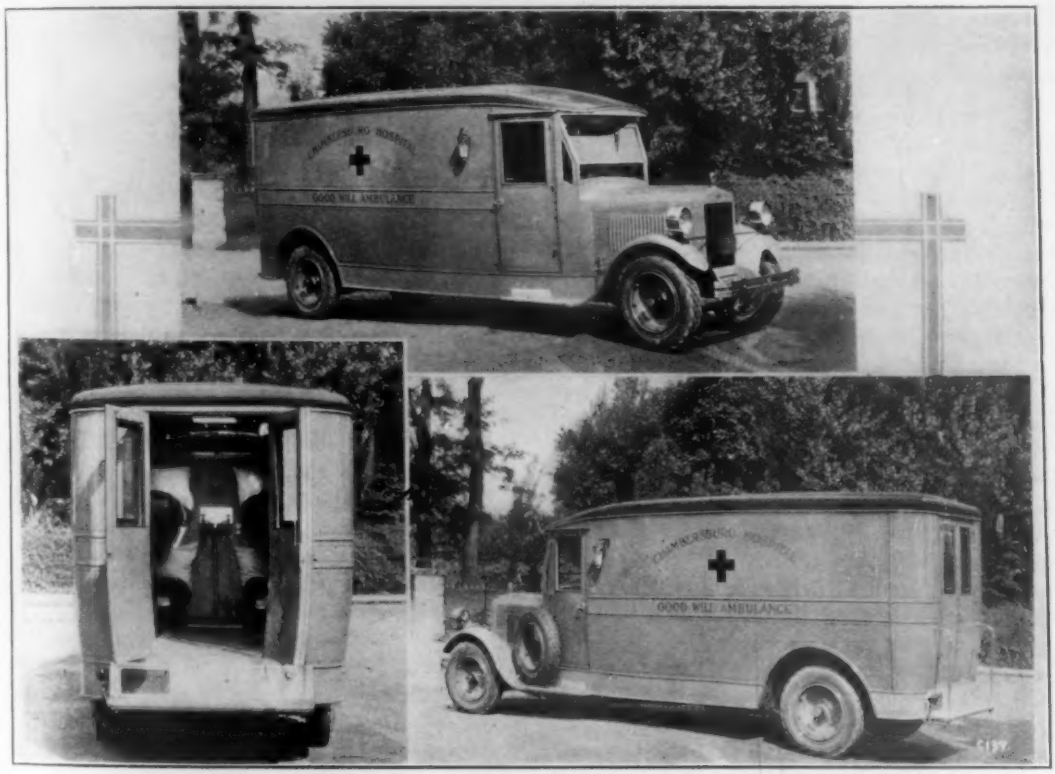
STREET AND HIGHWAY LIGHTING IN 1926 MUNICIPAL INDEX

Section 15 of the 1926 MUNICIPAL INDEX, devoted to the subject of street and highway lighting, has been prepared through the cooperation of C. H. Shepherd, Consulting Engineer, Engineering Service Corporation, Chicago, Ill. In his discussion of this important subject, Mr. Shepherd takes up the promotion of a street-lighting system, its financing, construction, types of circuits, overhead and underground wiring, typical installations, and highway lighting.

Motor Equipment Protecting Property and Life



MOTORCYCLE POLICEMEN ON HARLEY-DAVIDSON MACHINES PATROLLING REPARTO MIRAMAR IN HAVANA, CUBA



LOCAL FIRE COMPANY PRESENTS CHAMBERSBURG CITY HOSPITAL WITH WELL-EQUIPPED GARFORD AMBULANCE

The Good Will Fire Company of Chambersburg recently presented this completely equipped ambulance to the local hospital. The ambulance body has especially prepared panels and steel with walnut sash and doors, and beveled plate glass. The inside walls are of bird's-eye maple, and the floors are of quartered oak, covered by a rubber mat. It contains four cots arranged two on each side one above the other, similar to berths in a Pullman car. The interior fittings are most complete, including a supply of hot and cold water, the water being warmed through a special heater from the motor, a nickel wash-basin, a soap tray, a towel rack, coat hangers, and a cabinet for first-aid supplies. In addition to the four patients, the car is able to accommodate six attendants

CROSS LAKE, SHREVEPORT, LA., SHOWING THE DAM AND THE SPILLWAY, AND THE ROAD LEADING INTO SHREVEPORT, WHICH IS SEEN IN THE BACKGROUND

The Cross Lake Water Reservoir at Shreveport

By L. E. Thomas
Mayor of Shreveport, La.

THE proposition of a new base of water-supply for the city of Shreveport has been agitated for more than twenty years. Our present water-supply comes largely from Red River, especially in low-water season. The water of this river is very hard and contains some salt, and its taste is not very desirable during low-water periods. When the river is high, or after a very heavy rain, a considerable supply of water comes from Caddo Lake down through Twelve Mile Bayou and Cross Bayou, which empties into Red River at the city limits. This water is very good during the winter season, but during the long summer months of low water the quality is not very desirable.

Cross Lake is about 11,000 acres in extent and drains a watershed of more than 204,000 acres. This area of ground is located about three miles northwest of Shreveport and is about nine miles long and from one and one-half to four miles wide. When the raft or dam was in Red River, the water was backed up into this lake, and made it a navigable body of water on which steamboats operated for many years and, in fact, never ceased operation until the raft was removed in 1873. This lake then dried out and left nothing but a small channel, and the bed could be traversed with vehicles from one end to the other. There was some litigation over the title to the land, but it was finally decided by the Department of the Interior, after a thorough investigation, that the title was vested in the state of Louisiana, because the lake was a navigable body of water in 1812, when the state of Louisiana was admitted to the Union.

In 1910 the Legislature of Louisiana authorized the sale of the tract of land embodied in the lake to the city of Shreveport for a water reservoir at the nominal price of $1 per acre, reserving to the state any mineral rights, but with an agreement that they are not to be exploited or used in any way by the state as long as the city uses it for a water reservoir and source of water-supply for the city of Shreveport. This question lay dormant for ten or twelve years, until the present administration came into office, in November, 1922, when work was begun at once to make use of this new source of supply. Suits were brought to eject trespassers on the land. Some thirty or forty cases have arisen and the city has won in every case, both in the District Court and in the Supreme Court of the state.

A bond issue for one million dollars was voted by the people in October, 1923. The 5 per cent bonds were sold at a good premium and interest on the deposit, and work began immediately on the development of the prop-

osition. The J. N. Chester Engineers, of Pittsburgh, Pa., were employed as consulting engineers to prepare the plans and specifications. Contracts were let in August, 1924, for the dam, revetment work, conduit, clearing of the lake, and other improvements. The total cost of the work amounted to a little less than $700,000. The other funds of the bond issue were used for water and sewer extensions and improvements at the water-works plant, which is municipally owned.

The Dam

The dam impounding the waters of Cross Lake consists of an earthen fill nearly 8,000 feet in length, averaging in height from 15 to 40 feet, with a crown of 18 feet supporting a railroad track, and with a base of 125 feet at the widest part. The inside or water slope is reinforced with an impervious fill to a point 6 feet above the wave action height, revetted with 10 inches of graded crushed stone for wash protection. This revetment extends down into the water to the toe of the slope. About 1,000 feet from the south shore is located the concrete dam, with a spillway 225 feet long. The dam is 27 feet in height, with about 20 feet out of the ground, stepped down to the lower elevation below the dam. On either end of the dam are abutments with two piers at equal distance from the abutments, all of which supports the steel girders of the K. C. S. Railway bridge, which spans the spillway.

This dam, which was completed in June, 1925, is neat in its construction and will afford a beautiful sight when the reservoir fills and overflows.

The water is now overflowing the dam at the spillway and we have twenty billion gallons of water in storage. The formal opening of the reservoir took place on January 30 this year. The lake presents a beautiful appearance and ranges from four to twenty feet deep, according to the location.

There are several islands located in the lake belonging to the Federal Government. The city is preparing to purchase these islands, as an act of Congress has been secured enabling the city to do so.

The water is soft and will furnish an abundant and wholesome supply for this city at all times. In fact, the supply of water will furnish a city of more than 250,000 population, and can be increased by raising the elevation of the dam and the other work necessary at some time in the future. This has been a great accomplishment for the good of Shreveport and will prove of untold benefit to the citizens as well as to the industrial and manufacturing plants of our city.

The History of Street Lighting in New York City

LIKE daylight, the lighting of the streets of New York has long been accepted almost as a natural phenomenon. This is, perhaps, the highest compliment that can be paid to the local department of the city government in charge of the illumination of the highways, as well as to the companies supplying the service.

New York, however, has not always had the illumination of the present day. In the early days of the city, property owners were required by the authorities to hang lanterns in front of their homes or places of business, this being the only form of illumination. In those days curfew rang soon after sunset. Shutters were put up and doors were bolted long before midnight and there was practically no legitimate street life or travel at night, excepting to meet emergencies.

In the middle of the sixteenth century those finding it necessary to use public ways after dark were dependent upon the moon or upon torches carried by hand. The first attempt of which there seems to be any reliable record of municipal authorities undertaking public illumination of highways, occurred in the city of Paris about 1558, when, at public expense, in the most important thoroughfares large metal basins were filled with pitch or resin and were kept burning during the night. Early in the nineteenth century that medium which has become one of our greatest public utilities—gas—was first used as a street illuminant, to be followed by the electric arc lamp, which, in the latter part of the last century became a medium of general public illumination along with the incandescent lamp.

Colonel Roosevelt, when a Police Commissioner of New York City, once said that an electric street light is equal to a policeman as a means of preventing crime. Comparatively few realize the extent to which our night customs have changed and the streets of the city are used for industries and commerce which were formerly confined to daylight hours. Long after places of amusement have been closed and are dark and people have returned to their homes, a vast army of workers enters

into our industrial life. There are the men who print and deliver the great newspapers, who bake and deliver bread, who bottle and deliver milk, all faithful toilers who in spite of sun or rain, heat or cold, attend to their duties, and to these must be added the men who bring to the city the products of the farm and other necessities of life and who increasingly are engaged in night transportation of the products of our industries and commerce. Adequate illumination has become as necessary for these workers of the city as for those who seek pleasure in the earlier hours, as for the police and firemen in protecting our lives and property.

When electric light first became available for street lighting, what is now called the Great White Way was a district of small residences and boarding-houses. New Yorkers do not have to be very old to recall the tall towers experimentally used in supporting clusters of arc lights—small suns on towers about 160 feet high and intended to shed light somewhat paralleling daylight over the areas around Union and Madison Squares. This method was quickly found impracticable, partly because of the enormous loss of light with distance and the intense shadows that were created, perhaps more objectionable than any general average of semi-darkness or low illumination.

The next step was the utilization of the arc lamp, first of the open type which had to be trimmed and adjusted each day, followed by the closed type which burned for a considerable number of hours without retrimming or attention. The present standards of public illumination began in 1892 with the introduction of the so-called twin arc lamp, supported by artistic posts and first used in the illumination of Fifth Avenue in the Columbus celebration of that year.

New York City officials have always been exacting in insisting upon maintaining the highest standards of public illumination. No excuse was or is acceptable for any interruption, however slight, resulting in annoyance or inconvenience to any citizen or to the public in general. So much emphasis was placed on the need for continual highway service that a "light patrol" was maintained on each avenue and cross-street from dusk until daybreak, replacing fuses and broken carbons or making any necessary readjustments—for electrical illumination on the highways was then in its infancy and the lamp-controlling mechanism had not reached its present-day perfection. From twilight until dawn, wherever electrical illumination existed, the city was being constantly patrolled by an organization of which few, if any, outside of the electrical utilities, have heard. In 1914, another system of illumination was introduced, namely, the incandescent lamp, specially designed for street illumination and is now accepted as one of the most effective and efficient mediums for the accomplishment of street lighting. To-day approximately 84,000 electric lamps are used to light the city's streets and avenues, and no effort or expense has been spared to secure the highest degree of coordination between the beauty as well as the utility of the lamp and its supporting post with the widest range of the most effective illumination attainable. It may be a matter of surprise to many to know that the posts by which the lamps of the city are supported were designed by artists of national prominence, and were studied in great detail and finally approved by the public authorities, including the Municipal Art Commission. Even what may seem a most minute detail, the leaf design at the top of the post, was studied and finally approved by one of the world's greatest architects, the late Stanford White. These posts which remain unchanged from the days of their earliest adoption, having long been considered as standards or models for street illumination in this country and in Europe.

It is doubtful whether any other large city in the world maintains equal standards of illumination throughout its occupied areas. Closest investigations have failed to disclose anything to be desired in making comparisons with such great centers of population as Paris, London, Vienna, Brussels, Stockholm, Berlin, Rome, and other European cities. All may have spots or sections in which public illumination approaches that of New York, but in service such as this, the city as a whole must be considered. It is not a question of Broadways and Fifth Avenues only, but also of those other areas usually most densely populated with human beings, but which unfortunately frequently receive the least attention. In this, it is believed that New York is an exception, as will be observed by any one undertaking perhaps one of the most pleasing of all available excursions around New York—a night ride through the different boroughs of the city.

ACKNOWLEDGMENT.—Prepared from an address broadcast through Stations WJZ, New York, and WRC, Washington, during the New York Edison Hour, by Arthur Williams, Vice-President, Commercial Relations, The New York Edison Company.

Growing Games

By Jay B. Nash

Superintendent of Recreation and Director of Physical Education, Oakland, Calif.

A SNAP judgment would probably be that games are invented; namely, that some one says, "The country needs a new game," and therefore sets about inventing it to fit modern social conditions as well as the physical space in which it is to be played. As a matter of fact, that has not been the history of games. Games evolve; they grow; they change along with modern life and to a large extent to meet the changing conditions of modern life.

Modern football evolved from soccer, through the various stages of rugby, to its present points of organization. Baseball evolved from one-o-cat to long ball, to its present highly organized state. The game that probably came nearer to being invented was basketball, and yet it was to a large extent a combination, and since the game was first played has been subjected to many changes.

THE NEW GAME OF BONARRO AS PLAYED IN THE OAKLAND PARKS

Speed ball combines the elements of football, soccer and basketball.

One of the newest games to evolve is Bonarro. It also is a combination game, having the activities of archery and golf. Bonarro comes at a very opportune time to fill a community need. Many people feel that the fine sport of archery is more or less monotonous; that it exercises a few sets of muscles to the exclusion of others. By setting up eighteen targets at which the contestants shoot in turn, Bonarro combines the accuracy of archery with the fine general exercise of walking involved in golf.

The shooting distance may range anywhere from one hundred yards to five or six hundred yards, thus having a fine variety of accuracy shots and distance shots. The game is scored similar to golf, counting the number of shots to "hole a putt," namely to reach the bull's-eye with the arrow.

This game should come as a boon to small communities, recreation clubs, and other groups which have found the expense of constructing a golf course beyond their financial means. The game has another advantage, namely, the wide range of age groups to which this game appeals. With a twenty-pound bow, the child of eight can play the game, while a man can effectively use a bow up to seventy or eighty pounds.

Many people have been laboring under the impression that Bonarro is played on a golf course side by side with golf. Of course this is not the situation. It is laid out on an entirely separate piece of land.

Safety measures are taken just as in golf. No person is allowed to shoot until the players ahead are out of range.

Even the beginner in Bonarro has a high degree of accuracy as compared with the beginner in golf. Experience has proved that it is probably not as dangerous as the game of golf.

Definite rules and regulations for the game of Bonarro may be obtained by addressing the Oakland Recreation Department, 404 City Hall, Oakland, Calif.

The Growing Movement for County and District Hospitals

PIONEER work in various localities in establishing rural hospitals has been investigated by the U. S. Department of Agriculture, with the object of encouraging similar action elsewhere. As indicating the need for better rural hospital facilities, the department draws attention to the fact that there is a growing shortage of country doctors. Graduates in medicine, after going through an expensive and lengthy specialized training, prefer city practice where up-to-date medical facilities are available. They feel that to practice without these facilities is to sacrifice much of the value of their training. Accordingly, a necessary step in combating the abandonment of country practice by doctors is to furnish adequate hospital facilities in the country.

Not more than 12 per cent of the rural population of the United States, it is said, enjoys anything like modern health supervision.

Credit for taking the initial step in a movement to satisfy the requirements of the modern physician in this respect is given to Washington County, Iowa, which was the first county in this state to take advanage of the state hospital law passed in 1909. This was the first law of its kind enacted anywhere in the United States. It authorized counties to tax themselves for hospital purposes. Under this law Washington County proceeded at once to erect a modern hospital, which is now in successful operation. Since then 16 other states have passed laws similar to the Iowa law, and many rural hospitals have been built. Forty were studied by the department's investigators in making the rural hospital survey.

Rural hospitals have been of particular value in maternity cases. Although the city death-rate in the United States has decreased the rural death-rate, according to health authorities, is stationary. This is largely due to the prevalence of child and maternal mortality on farms. It has been estimated that 750,000 women annually pass through child-birth in the United States without medical attention. A large proportion of these women live on farms. There is no doubt, says the Department, that the mortality rate among them could be greatly reduced by the provision of adequate medical and hospital facilities. Neglect of motherhood is also held responsible for many of the physical defects of children. Country school children, according to medical authorities, are handicapped by more physical defects than are the children of the city. It is considered significant, too, that, for the first time in the history

of American vital statistics, the country in 1921 had a higher death-rate for babies under one year than the city.

In a report on the country hospital situation, the Department describes county hospitals supported by taxes; county hospitals connected with country homes; township hospitals; town hospitals; district hospitals; community hospitals; and hospitals supported by arrangement between communities and physicians. These are all doing good work in the various circumstances to which they have been adapted. Generally, says the Department, the best satisfaction is given rural people by hospitals in which they have a direct interest. Town hospitals are usually open to the farm population in neighboring territory, but are apt to be looked on by the farmers as not primarily intended for them. Trustees controlling town hospitals are urged to make their availability known to farmers.

BRINGING A FARM PATIENT BY AMBULANCE TO THE COUNTY HOSPITAL IN FAIRFIELD, IOWA

This hospital was built in 1922 by a bond note of all the people in the county

An interesting development is the formation of hospital districts, where county and township lines make local political communities too small for efficient public service. One such district hospital has been established at Berea, Ohio, by communities in two counties. Six distinct political subdivisions are included in the hospital district, which was formed under a state law passed for the purpose. A new hospital building was erected at a cost of $110,000. Community hospitals built by public subscription or by organizing stock companies and selling shares to a large number of the community have been successful. They compare favorably with other rural hospitals, says the Department.

Health and medical officers are increasingly taking notice of the health problem presented by the 50,000,000 people living in rural territory. New state laws are removing legal obstacles to the establishment of rural hospitals and a movement to multiply their numbers is under way. Much has already been done, says the Department, to make farmers realize the value of hospitals and to remove old standing prejudices against them.

Hospitals for Rural Communities

ANNOUNCEMENT of an initial appropriation of $350,000 to be expended for the construction of two hospitals in rural communities has been made by the Commonwealth Fund, a philanthropic foundation with offices at 1 East 57th Street, New York. This appropriation marks the beginning by the Fund of a new project which will involve the building of two such hospitals a year.

Farmville, Va., as been selected from among more than fifty applications as the location of the first of these hospitals, following a special study by Henry C. Wright, hospital consultant.

The Division of Rural Hospitals, just established by the Fund, plans to receive applications from rural communities under certain conditions, chief of which is that the Fund will in the case of approved applications contribute two-thirds of the cost of construction and equipment of the hospital, while the local community must contribute one-third. The community must also meet operating and maintenance costs.

Referring to this new project, the annual report of the Fund says:

That rural communities, despite certain natural advantages, frequently afford a less satisfactory opportunity for healthful living than many of our cities; that the infant mortality rate in New York City, for example, is lower than for the state at large and that similar conditions exist elsewhere—these are established facts.

Among the most important needs in many such communities is that of a modern and well-equipped hospital. Lack of reasonably available facilities often means retarded medical progress. It has meant also that the numerous allied activities which a good hospital stimulates and of which it is the center, such as out-patient clinics, education of the people along health lines, and control of communicable diseases, have developed slowly and less effectively.

The Progress of Systematic Street Tree Planting in American Cities

By Malcolm Howard Dill
Landscape Architect and Town Planner, Dayton, Ohio

WHAT should we think of a city which permitted every landowner to follow his own whim as to the kind of pavement to be used in front of his property, or even left it optional with the individual as to whether there should be paving at all! Some persons would probably use brick, others concrete; some asphalt, and some—for reasons of economy—mud! A pretty patchwork mess would result.

Yet just such a hodgepodge is to be found on considering the street tree plantings in most cities of the United States. We have to ride and walk on the pavements—our own personal comfort is thereby affected; whereas we only have to *look* at the trees. And for most of us it will be a long time, if ever, before the esthetic aspect of seeing becomes as important as the comfort side of feeling.

Fortunately, a considerable number of American cities have already realized the importance of systematic street tree planting, and are carrying out a definite policy for present and future development. Perhaps the municipality whose work along these lines has attracted the most attention is Newark, N. J., whose organization and methods have been a model for many other cities. In New Jersey, as also in Pennsylvania and Massachusetts, the work of tree planting has been facilitated by state legislation, which definitely authorizes the creation of such shade tree boards or commissions as that of Newark. A state law of this sort not only offers a positive suggestion to cities in the state for the creation of shade tree organizations, but also serves as a buffer against possible legal complications which might arise were there no authorizing act.

Except for the early rudimentary gropings for the "City Beautiful" idea, much of the activity in city planning in the United States has seemed to tend toward emphasis on the more practical phases of planning work, such as zoning, traffic, and transportation. That this should be so is natural and fitting; a house to be truly beautiful must first be made orderly and convenient. Yet no one would care to live in a house, however conveniently arranged, unless it had in addition those features that bring comfort and attractiveness—that transform a house into a home, in the best sense of the word.

Probably no one feature can do more toward making an inviting city out of an otherwise unlovely one than fine trees. Not only are they attractive in themselves, but also, with so general a prevalence of architectural heterogeneity as we have in American cities, it remains for homogeneous street tree planting to assist in drawing together the often discordant building masses into a more harmonious ensemble. Their good points, to be sure, are not confined to esthetic ones; the beneficence of trees in purifying the air, giving shade, and transpiring moisture is too well known to require further comment.

Therefore, inasmuch as it is part of the purpose of city planning to make cities more desirable and healthful to live in, the matter of systematic street tree planting should be of moment to professional city planners, and to all others interested in that subject.

A Questionnaire to Park Superintendents

In order to ascertain what progress has been made by American cities in this matter of organized planting, the writer mailed to the Superintendents of Parks of all cities in the United States whose population in 1920 was 100,000 and over, the questionnaire which follows. The limitation of size was arbitrary, but it was obviously necessary to draw the line somewhere.

1. *Has your city a Forester, or a body corresponding in function to the Shade Tree Division of the Department of Parks in Newark?*

2. *If so, is he, or it, active in establishing a definite policy in regard to planting and maintaining trees, through personal effort, lectures, pamphlets, newspapers, or otherwise?*

3. *Is there any municipal control over the planting, maintenance, and cutting of trees?*

4. *Has any effort been made to promote the planting of trees in the down-town districts, wherever there is room for them in the sidewalk area?*

5. *Has your city a municipal nursery for street and park trees?*

Analysis of the data obtained from all these cities makes possible the drawing of some definite conclusions.

A FINE STREET MADE BEAUTIFUL BY A UNIFORM PLANTING OF BLACK ACACIA TREES

Four Types of Organization

1. There appear to be four more or less distinct types of organizations for the administration of street tree control:

a. An independent commission, appointed by the mayor, (New Orleans—Parking Commission); or by commissioners or council as authorized by state law, (Scranton—Shade Tree Commission).

b. An independent municipal department, corresponding to the Park Department, Street Department, etc. (New Bedford, Dallas).

c. A division, bureau, or function of the Park Department (Newark, and 37 others out of 49 reporting any sort of activity in street tree work).

d. A division of some other department, such as the Street Department (Hartford), Department of Public Welfare (Grand Rapids), Street and Sewer Department (Wilmington), and Board of Public Works (Kansas City, Mo., New Haven, Richmond).

Of these, the third is so predominant numerically that it would seem to be indicated as the most generally satisfactory arrangement. Local conditions, of course, may make one of the others preferable.

Where executive authority for municipal tree work is vested in an individual, he is usually one of the three following officials:

a. The Forester (Tree Warden, etc.), having control over both streets and park trees (majority of cities), or over street trees only (Dallas, Fall River, Indianapolis, Kansas City, Mo., New Bedford).

b. The City Horticulturist (Indianapolis), Park Forester (Dallas), Supervisor of Department of Trees and Shrubs (Kansas City, Mo.), having charge of park trees only.

c. The Superintendent of Parks (Akron, Minneapolis*).

On the face of it, it would seem that conferring such additional responsibility on the Park Superintendent is, or should be, only a makeshift in case of lack of funds. In cities as large as these there is unquestionably

* Minneapolis has a City Forester, but the ordinance seems to indicate that all the detailed responsibilities devolve upon the Superintendent of Parks.

enough potential tree work to justify the employment of a City Forester.**

As to division of responsibility between a Forester and a Horticulturist, it appears to the writer that a single well-paid official, having an efficient organization of subordinates, could in most cases work more efficiently and economically than two less-well-paid heads of separate street tree and park tree departments. Note, however, should be made of the arrangement in Newark, where there is both a Forester and an Arboriculturist, working with the Superintendent, all of the same Shade Tree Division of the Park Department. Thus there is diversity of individual function, but unity of control.

Whatever the specific type of organization or executive, it is true in any case that there should be cooperation between them and the City Plan Board. An example of the need of their working together is to be found in the matter of locating trees in the planting strips so as not to interfere with future street widenings.

Swinging Public Sentiment in the Right Direction

2. The greater the extent of municipal control over street trees, the less propaganda, of course, is necessary. Where the work is entirely done by the city, as in Buffalo, Detroit, Hartford, Minneapolis, Newark, New Bedford, New Orleans, Richmond, Springfield, Mass., and Worcester, and where sufficient funds are available to do the work efficiently, the top of the hill has been reached, and the citizenry begins to take municipally done street planting as a matter of course. But where regulation is only partial, where funds are inadequate, and where there is inefficient overlapping of jurisdiction and control, a good man in the executive's shoes can do much toward swinging public sentiment in the right direction. In some instances, among the replies received, such effort is apparently being earnestly made. The Forester at Grand Rapids reports lectures being given before Improvement Associations, High School, and Junior College, weekly newspaper articles, exhibit at the annual Home Show, circulars, and radio talks; Kansas City, Mo., speaks of letters to all civic organizations and newspapers; Newark, with all the work it has already accomplished, is still active, through Mr. Bannwart, the Superintendent of the Shade Tree Division of the Park Department, with pamphlets, lectures, Arbor Day leaflets, and so on. Other cities reporting active propaganda of some sort include Baltimore, Boston, Bridgeport, Cleveland, Columbus, Dallas, Denver, Houston, Indianapolis, Milwaukee, New Haven, New Orleans, New York, Paterson, Philadelphia, Richmond, Rochester, Salt Lake City, Scranton, St. Paul and Toledo. Very good work is being done by The American Tree Association, with headquarters at 1214 Sixteenth Street, N. W., Washington, D. C., and by The American Forestry Association, 1523 L St., N. W., Washington, D. C., both of which organizations will furnish free literature and instructions to anyone interested in tree planting.

Essentials of a Shade Tree Ordinance

3. An ordinance, or its equivalent in regulations, is usually essential if a systematic street tree planting program is to be carried out. Such an ordinance should include, and in the majority of cases, does have, provisions for regulating the planting, maintenance, protection, and removal of street trees. On the last three points there seems to be a fairly uniform policy among cities, though in some cases the funds available for proper maintenance are insufficient. It is a matter of vital importance that there should be provision for adequate maintenance *by the city;* care by property owners cannot be relied on. And it should be remembered that—except for the rather rare instances where there is no planting strip on narrow streets, and the tree-rows must therefore be located inside the property-line—the street trees are within the dedicated area which belongs to the city; and the trees themselves are therefore city property, just as much as are sidewalks, gutters, and pavements, and should logically be under municipal control and care.

As regards planting, there is considerable diversity of policy among cities. In many cases owners are allowed to plant approved species under permit, no planting being done by the city. This situation exists in Cambridge, Columbus, Denver, Des Moines, Grand Rapids, New York (Manhattan), Salt Lake City, and Wilmington; in others, the city does some planting, where it is thought necessary, and permits citizens to plant, if they so desire. Among these are Chicago, Cleveland, Kansas City, Mo., Pittsburgh, Providence, Scranton, St. Paul, Toledo, Washington, and probably several others, whose replies were somewhat

** This term is really a misnomer, for the work of such an individual is not forestry. In some cases the more appropriate name of Tree Warden or Arboriculturist is used, and such a name is to be preferred. But inasmuch as the term City Forester is in much more general use, it has been retained in this article.

ambiguous on this point. In a few cities, as noted in No. 2, no street planting at all may be done by the property owners. It seems evident that this most drastic method is the best, for, unless there is cooperative action taken by citizens of certain communities, to plant similar-sized trees at the same time (as is rarely likely to happen), the planting spirit will move different individuals at various times, and the trees will be of varying sizes, even though they may have been restricted to the same species by permits. The equivalent of the planting actually being done by the city is found in cases where notice is sent to property owners in a given section, requiring them to plant as specified. If action has not been taken after thirty days, the city does the planting, and assesses the owner therefor (Toledo). It seems better, however, for the proper city organization to do the work in the first place, for it will have, or should have, the necessary facilities for planting, and should be able to do it for less than it would cost if done by the individual. A few cities plant trees gratis (Yonkers), but this seems to be no more justifiable than doing free street paving. In the long run the citizens have to pay for such work, even though indirectly, and it would be fairer to charge for it on a pro rata basis. Scranton does pruning, spraying, and repairing free, but charges for planting and removal.

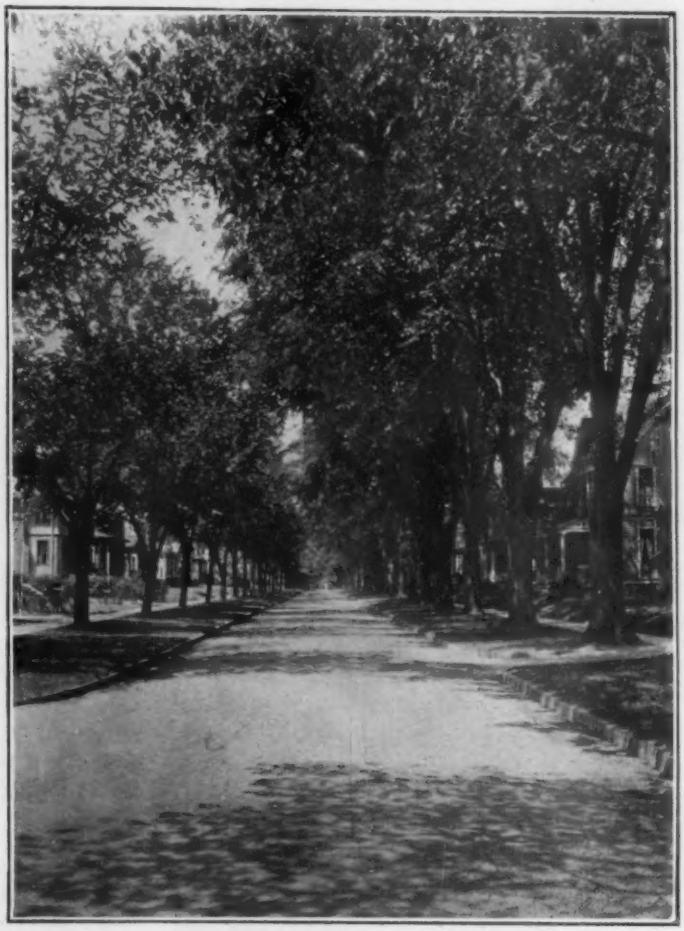
In the case of subdivisions outside the city limits, it may be possible to control street planting through county or regional planning boards or authorities, or in connection with three-mile-limit platting laws, when such bodies or laws exist. Subdivision plantings outside of the city would probably be done by the development companies, but it should if possible be required of them to cooperate with the city shade tree department as to location, spacing, and species of trees, and methods of planting. There is significance in the fact that at its 1925 convention in Detroit the National Association of Real Estate Boards favored the requiring of tree planting in every real estate subdivision.

Methods of Planting in Certain Cities

It may be worth while to note particular methods of provision for planting in certain cities.

In Akron, trees are planted along with the paving of any street, and the property owner pays 98 per cent of the cost of trees and planting, as in the case of paving costs. The Superintendent of Parks supervises planting. All proposals or bids for paving are filled at a uniform rate—$11 a tree. All contractors must bid at that rate, and the city takes back that portion of the contract at the above price; the Park Department buys and plants the trees, and places guards. Proper machinery to provide funds for future maintenance is lacking —a serious defect, but remediable.

In Detroit, planting is done either on petition of 60 per cent of the owners of abutting property, or by order of the City Council, on



FINE OLD ELMS GIVE DISTINCTION TO STREETS WHICH WOULD OTHERWISE BE COMMONPLACE

recommendation of the Commissioner of Parks and Bulevards.

Hartford, which does all the street tree planting, has no detailed ordinance relating thereto, but gives the Board of Street Commissioners control, and annual appropriations are made to the Street Department for the work. The Connecticut Legislature has recently passed a bill empowering cities and towns to plant and maintain trees on private property, not more than ten feet within the property-line, subject to the approval of owners of abutting property. Such a law is helpful in solving the problem of planting in narrow streets.

New Bedford likewise does all its street tree planting, and in addition the City Forester has jurisdiction over all trees in the city as regards moth infestation.

Springfield, Mass., plants its own trees, and reports that no propaganda is needed as the citizens' demand often exceeds the available appropriation.

In St. Louis planting is done by request, or at the discretion of the City Forester, subject to objections by a majority of the property owners.

Trees in Business Streets

4. The nearly unanimous answer of "No" to question No. 4 makes it appear very improbable that the streets of our business districts will bear any resemblance to those of Paris, Berlin, and many other European cities, at least in the near future. The point was made by one Forester, that there is still too much work to be done in residential districts, where conditions are comparatively favorable for street tree growth, to justify bothering about the difficult problem of maintaining trees in the down-town districts. This is probably true at the present time, but the tree-lined, shady business streets of foreign cities and of Washington, can serve as an ideal toward which American cities may well aim.

5. There seems to be little question that any city large enough to maintain a department to do the planting of trees could also raise its own street trees in a municipal nursery. By so doing it has at hand a constant supply of trees of requisite species, in proper sizes for new plantings and renewals; and if the nursery is efficiently managed, the trees may cost less than if purchased from a commercial nursery.

It seems likely that in a city where municipal acivity in street tree planting is extensive, the public interest in general planting will tend to increase, so that the greater demand for lawn trees, shrubs, and flowers will more than make up for the loss of street tree sales which nurserymen might have made to the city, or to property owners.

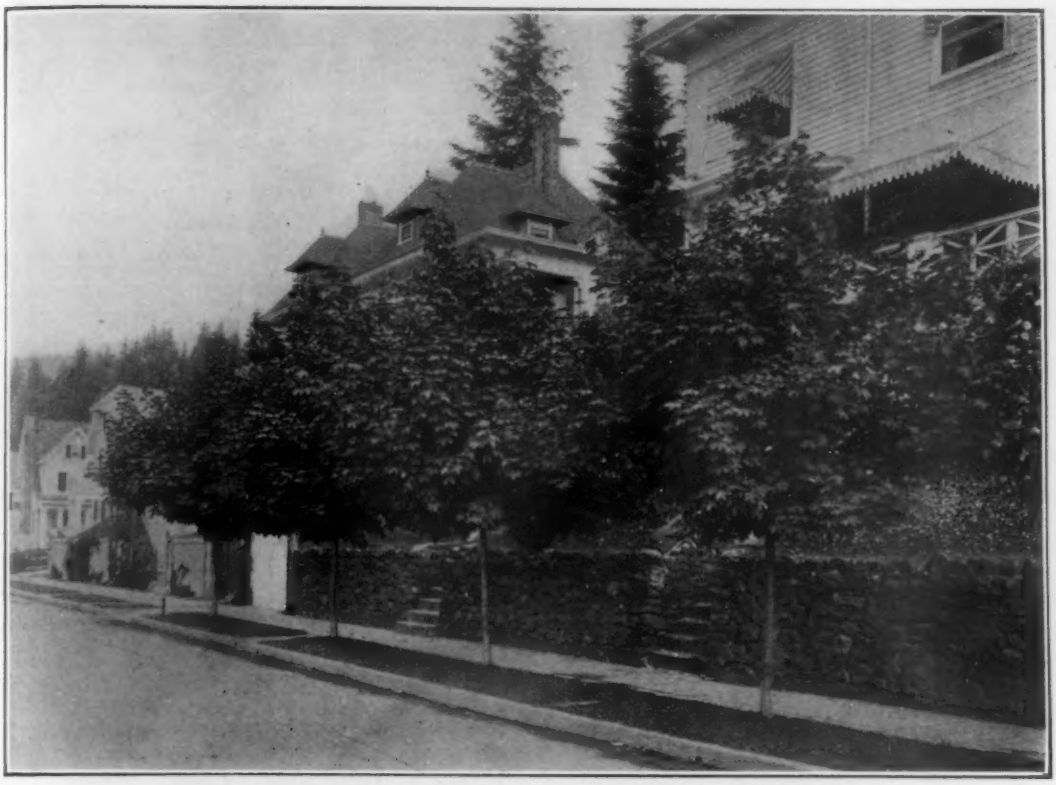
The Placing and Spacing of Trees

Perusal of some of the city ordinances received shows that practice in many cities as to the spacing of trees leaves much to be desired. In a number of cases 25 feet is specified as a minimum distance between trees. There are few, if any, of the trees best adapted to street planting which should be spaced less than 40 feet apart. In the case of elms, 60 to 75 feet is none too much to allow for their eventual growth.

For any street less than 60 feet wide it is desirable to stagger the trees on opposite sides of the roadway in order to allow as much distance between them as between those on the same side. The matter of the relation of trees to lot-lines is important, and should have careful consideration in any street planting scheme. Some persons recommend planting as nearly as possible on the side lot-lines, but that location frequently interferes with automobile driveways. The objection to placing them in the center of the lot is that they would then usually appear opposite the center of the house—an undesirable arrangement from the point of view of appearance. The best placing would seem to be about one-third of the distance from either lot-line.

A difficult problem presents itself in the case of streets where there are existing trees of many species, and of variable quality. If many of the trees are good specimens, it would be unkind to the property owners to substitute saplings for large trees, though the next generation might bless the daring hand that directed the axe. The cutting of any tree usually calls down a storm of abuse on the person responsible for its removal, but there are certainly places where a far-sighted policy must demand the sacrifice of trees of undesirable species in favor of others which will before many years produce a fine, permanent effect. There will be many such instances which will call for the wise and broadminded use of authority by Shade Tree Commissioners and their executives, and for this reason it is essential that such men be chosen for qualities of intelligence and good judgment, as well as practical ability.

It is to be hoped that the time will soon come in most cities, as it already has in some, when the matter of street tree planting will be re-



A FORESIGHTED PROPERTY OWNER PLANTED THESE FOUR NORWAY MAPLES

A shade tree commission might have required similar planting for the entire street, but would probably have set the trees twice as far apart. Close planting is particularly objectionable with Norway maples on account of their dense shade

garded in the light of a public utility—that is, a public necessity under public control, and will accordingly be managed on a correspondingly systematic basis.

Extent of Daylight Saving in Northeastern United States

IN an article entitled "What about Daylight Saving?" Robert H. Fuller, Manager, Publicity Bureau, the Merchants Association of New York, outlines the arguments for and against daylight saving, and gives the result of a canvass recently conducted by his Association as to the extent of daylight saving in the region north of the Ohio River and east of the Mississippi.

In New York State, where daylight saving is no longer mandatory, it still prevails under local ordinances in New York City and in 130 other cities, towns, and villages in the state.

In other parts of the region canvassed Mr. Fuller finds that, generally speaking, sentiment in the industrial states is preponderantly in favor of daylight saving and it decreases as the influence of the farmers increases. To quote in part:

"There are some exceptions which are due to a legislative representation based upon geographical divisions rather than upon population, such as exists in Connecticut. There, every town has a member in the Legislature, which is thus controlled by the farming element. The farmer members have used their power in Connecticut, despite the preponderance of its industrial population to pass a law which makes it an offense to show any other time than Eastern standard time on clocks or timepieces publicly displayed. Despite this statute, daylight saving is observed by the banks, business offices, stores and factories in 28 industrial centers.

"New Jersey is practically solid for daylight saving. That state is strongly influenced by the great cities of New York and Philadelphia, both of which have daylight saving. In 88 of its towns and cities, including all of the larger centers, daylight saving prevails.

"Perhaps the bitterest contest over daylight saving has been waged in the state of Massachusetts, where the farmers made a determined fight against the enactment of a mandatory state-wide law. The controversy was finally submitted to the Legislature in the last state election, and the friends of daylight saving carried the day by a substantial majority.

"The state of Rhode Island, which is preeminently an industrial state, is on the daylight saving basis. Here no serious opposition has manifested itself; but in the northern New England

states—Maine, New Hampshire and Vermont—the opponents have the best of it. In Maine there is daylight saving only in Portland and Bar Harbor. New Hampshire has an anti-daylight saving law, and in the agricultural and summer resort state of Vermont, the daylight saving sentiment is not strong.

"The results of the inquiry in other states are shown in the canvass made by The Merchants' Association as follows:

PENNSYLVANIA

Bristol	Pittsburgh
Corry	Philadelphia
McKeesport	

DELAWARE

Wilmington

WEST VIRGINIA

Wheeling

KENTUCKY

Covington	Newport

OHIO

Cincinnati	Hamilton
Dayton	Springfield

The following Ohio cities observe Eastern Standard Time throughout the year:

Akron	Lima
Canton	Marietta
Cleveland	Newark
Elyria	Sandusky

INDIANA

Crown Point	Hammond
East Chicago	Whiting
Gary	

ILLINOIS

Chicago and its suburbs.

MICHIGAN

Benton Harbor	Michigan City
Buchanan	Muskegon
Fremont	Newaygo
Grand Haven	Sault Ste. Marie
Grand Rapids	St. Joseph
Grant	Sturgis
Holland	

The following Michigan cities observe Eastern standard time throughout the year.

Adrian	Flint
Alpena	Jackson
Battle Creek	Kalamazoo
Bay City	Lansing
Detroit	Saginaw

WISCONSIN

Milwaukee—Banks and grain exchange observe daylight saving time.

"It is estimated that daylight saving, when it prevailed throughout the country, saved not less than a million tons of coal a year, which is a substantial conservation of a limited national resource. Figures compiled in St. Louis at the close of the first daylight saving season there, showed that the saving in coal was 17.5 tons for each thousand of population on the seven months' basis. In France the saving amounted to 250,000 tons a year."

Items from Here and There

Small County Employs Six Public Health Nurses

PUTNAM COUNTY, New York, on the map just a little thin wedge between the large counties of Westchester and Dutchess, and consisting of but six towns with a total population of less than 11,000 is reported by Dr. Matthias Nicoll, Jr., State Commissioner of Health, as having taken a most progressive step to advance the cause of public health within its boundaries. On December 29 the County Board of Supervisors voted an appropriation of $7,200 for county nursing service. This will permit the employment of six public health nurses. Up to the present time three of the towns in the county have each employed one nurse, the other three towns not having sufficient funds available for such a purpose. In the future the county will be fully covered. The nurses will do public health work and school nursing particularly, but in addition will do some visiting bedside nursing among those needing such service.

University of Baltimore to Teach Municipal Administration

BENJAMIN SCHWARTZ, Baltimore Attorney, has been added to the Faculty of the University of Baltimore to conduct a course in Municipal Administration. This course is designed to fill a need growing out of many movements in Baltimore for efficiency and economy in government. In view of the demand from civic organizations for "more business in government," the spread of the city manager idea, and the general recognition that success in governmental affairs depends upon competent men and women, there has arisen a new profession, the trained public administrator.

Mr. Schwartz is a graduate of the National Institute of Public Administration. He has served as Executive Secretary of the Bureau of Municipal Research of Yonkers, N. Y., and as Secretary of various legislative committees of the New York Legislature, and was also Secretary of the Baltimore Municipal Welfare Commission. He has just been appointed by Governor Ritchie as a member of the Maryland Interracial Commission, provided by the last Maryland Legislature to study the problem of the colored race in the state.

10,737 Local Governments in Minnesota

MINNESOTA is distinctive in having an extraordinarily large number of local governmental units within its confines. According to the December, 1925, issue of *Minnesota Municipalities*, there are in the state 87 counties, 65 home-rule cities, 24 non-home-rule cities, 635 villages, 1 borough, 1,961 townships, and 7,907 independent school districts. This means that there are 10,680 local subdivisions of the state, each with its governing board or council operating under state authority, and each with separate and distinct powers delegated from the constitution or statutes for the administration of a definitely prescribed area. In commenting on these figures, *Minnesota Municipalities* says:

"The very number of units suggests far reaching problems of inter-municipal affairs as well as relations between the state and its local subdivisions. The offices and employments within these local subdivisions conservatively estimated are not less than 175,000 in number. These include positions, paid and unpaid, full-time and part-time, associated with boards, commissions, and councils. They also include the clerks, inspectors, assessors, teachers, firemen, policemen, lawyers, laborers, and other

occupations required in the run of local work.

"Our system of local government is very difficult to fathom. This cannot be denied. The multiplicity of subdivisions gives rise to complications and intricacies in administrative areas which have their roots in the historical past. Undoubtedly, if we were to start anew in planning and organizing municipal areas, our local governments would be more adaptable and responsive to present conditions."

Conference of Swimming Pool Operators

A SUCCESSFUL conference for swimming pool operators arranged by the Connecticut State Department of Health was held at Hartford on December 29, with representatives from Naugatuck, Willimantic, Hartford, Torrington, Waterbury, West Hartford, Meriden, New London, New Haven, and Storrs in attendance.

Control of swimming pools in Hartford during the last four years was discussed in some detail by Dr. C. P. Botsford, Health Officer. The construction features of Connecticut swimming pools and the best methods of operation were also discussed. Emphasis was laid on the need for adequate supervision and analytical control of the swimming pool water. The sanitary code requirements were taken up at the round table discussion. A visit to the laboratories of the State Department of Health was made in the afternoon.

After a general inspection of the laboratories, the interest centered largely on water analysis and the methods by which a sanitary water-supply is maintained. For the benefit of those not familiar with the method, alkalinity of water and excess chlorine determinations were demonstrated.

Other speakers on the program included: S. H. Osborn, M. D., Commissioner of Health; W. J. Scott, Director, Bureau of Sanitary Engineering, State Department of Health; C. P. Botsford, M. D., Health Officer, Hartford; A. J. Danielson, Physical Director, Y.M.C.A., New Haven; C. L. Pool, Assistant Engineer, Bureau of Sanitary Enginering, State Department of Health; and Friend Lee Mickle, Director, Bureau of Laboratories, State Department of Health.

A New Crusader for Cleaner Cities

A NEW, artistic rendering of the Modern Crusader emblem, recently adopted by the National Clean Up and Paint Up Campaign Bureau, at 243 West Thirty-ninth Street, New York, will be featured in the 1926 campaign material. The new design shows the head of the "Crusader" with the words: "In the Public Service—Clean Up and Paint Up—A Modern Crusader" emblazoned prominently on scrolls across his armor.

This new rendering of the "Crusader" was adopted because it was found that while the original design of the "Crusader," mounted on a horse, showed up well when printed in large sizes, the lettering became difficult to read when greatly reduced in size.

A Fee to Park on Boston's Streets?

"THE advent of zero weather, the latest murders and divorces and even the suburban earthquake were shoved into minor positions in our newspapers," says *Current Affairs* in its issue of February 1, "to make room for the announcement of Mayor Nichols that he thought well of the suggestion for imposing a fee for automobile parking in Boston and that he requested the Street Commissioners to adopt it.

"As was expected, protests, commendations and cartoons appeared from all sides. The controversy is now simmering until February 17, when the Street Commissioners will hold a second hearing. At the first hearing on January 22, the Chamber and the Retail Trade Board asked for more time in which to study the idea.

"Reduced to simplest terms, here is what we understand is being proposed: Any owner of a passenger car who wishes to park his car in any part of the city of Boston would be required to have displayed on his machine a small metal plate which would indicate that he has paid to the city a fee for the right to park. This fee might be five dollars or it might be as high as ten dollars. It would be renewed annually.

"This plan would not modify the existing traffic regulations. For example, the payment of a fee would not permit a car owner to park on a street where parking is prohibited, or allow him to park on any other street longer than the one-hour limit. The police would enforce this requirement, as it would be a part of the street traffic regulations.

"The Mayor's Committee on Ways and Means, the originator of the scheme, believes that it would have a double-barreled effect. One hundred thousand autoists would relieve themselves of the amount of the fee, and the badly depleted coffers of the city would be enriched to the extent of $500,000 to $1,000,000, depending upon the size of the fee. Thus would the city be better able to stand the cost of adding 300 new men to the police force, and the real estate tax would not have to be increased for that purpose.

"Many autoists who park in the city streets would refrain from doing so, by leaving their cars at home, or bringing them in town and leaving them in private garages. This, it is claimed, would help to relieve the congestion upon our streets.

"Habitual violators of parking rules might have their licenses revoked, thus making this scheme a valuable aid to the enforcement of the parking rules.

"The following paragraph from the report of the Mayor's Committee explains the reason for the suggestion:

" 'The streets of Boston are being largely and regularly used as parking places, for long or short periods, by thousands of non-residents, who contribute nothing to the revenue of the city. This use of the streets accentuates congestion, increases the difficulty of handling traffic, and necessitates the maintenance of an enlarged force of traffic officers, thus imposing an additional burden on Boston taxpayers. It would seem only fair that a portion of this additional burden, if not the whole of it, should be borne by those who enjoy the advantages."

Chamber of Commerce Activities in Public Affairs

City's Financial System to Be Revamped

KANSAS CITY, MO.—Reorganization of the city's finance offices and an entire new system of business and budget procedure will become effective with the new commission-manager charter on April 10.

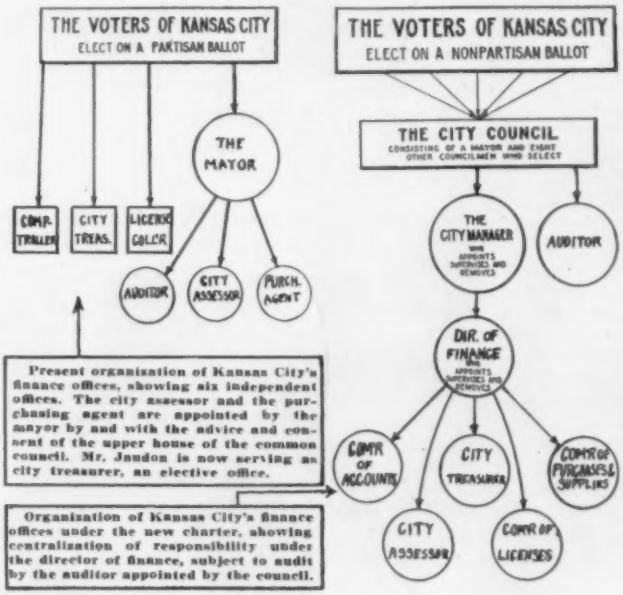
Ben Jaudon, who has been selected by City Manager H. F. McElroy as Director of Finance, will be responsible for the work in connection with making important changes required by the new charter. The charter requires that prior to April 10 an administrative code shall be drawn up and adopted as the first act of the new council. This charter provision as it applies to the department of finance is as follows:

"Such administrative code shall include a manual of accounting and business procedure which shall contain the form and method of keeping accounts and the form and nature of reports to be rendered in accordance with the provisions of this charter, and, in general, shall establish an accounting and business procedure which will make available information to the officials for their guidance, and information to the public which will enable it to judge the economy, efficiency and fidelity of service of the officials."

The charter provides for a consolidation of the present finance offices, of which there are six—comptroller, city treasurer, license collector, city assessor, and purchasing agent—in a single department of which the director of finance is the head. In the new department of finance Mr. Jaudon will be responsible for supervising the work of accounting, collection, custody and disbursement of funds, purchasing, stores, assessment of property for taxation, issuance and revocation of licenses, and sale of city property. He will also act as secretary of the Sinking Fund Commission.

The reorganization of the city's finance offices and the installation of a modern segregated budget system with businesslike accounting will mark the realization of efforts of the Chamber of Commerce in this direction for the past five years.

JOHN M. GUILD,
General Secretary, Chamber of Commerce.



Present organization of Kansas City's finance offices, showing six independent offices. The city assessor and the purchasing agent are appointed by the mayor by and with the advice and consent of the upper house of the common council. Mr. Jaudon is now serving as city treasurer, an elective office.

Organization of Kansas City's finance offices under the new charter, showing centralization of responsibility under the director of finance, subject to audit by the auditor appointed by the council.

An All-Year-'Round Fire Prevention Campaign

MANSFIELD, OHIO.—In preference to focusing the attention of our citizens on the problem of fire prevention during a one-week intensive campaign, after which the interest of the community is naturally apt to die down, the Fire Prevention Committee of the Mansfield Chamber of Commerce has developed the idea of instituting a 52-weeks-a-year campaign.

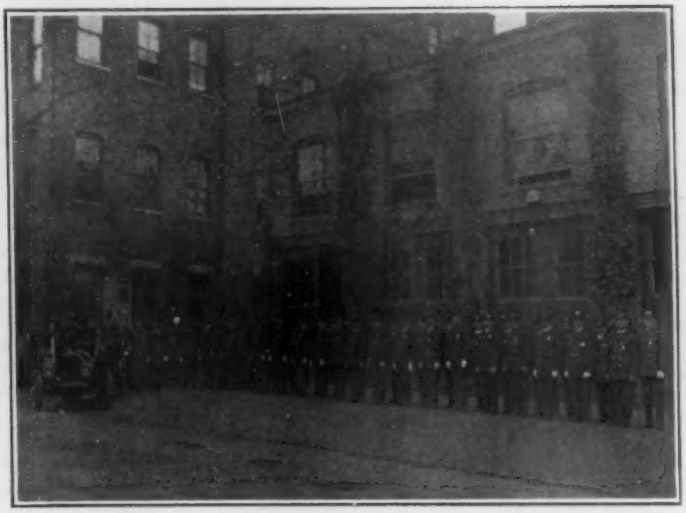
The plan is this: To each line of business and industry in the city, as well as to the civic clubs and the city itself, are assigned two weeks during the year in which to stage a fire prevention demonstration. This work was started last September by presenting the idea to representatives of the city administration at a meeting with our Fire Prevention Committee, of which the Fire Chief is a member. Their endorsement of the all-year-round plan was secured, and a campaign featuring the work of the local Fire Department was the first scheduled. Banners mounted on pieces of fire apparatus and paraded through the city on five-minute trips helped to announce the opening of the drive against fire loss. A miniature house was burned in our central park one evening before a large gathering; the use of aerial trucks and ladders at fires in high buildings was demonstrated; dummies were carried down ladders or thrown to nets; and many other incidents were illustrated in the effort to give the public all information possible as to the work of the Fire Department and its apparatus.

The printers and newspapers, in cooperation with the theatres,, were the next to take up the work. The Fire Chief assisted by addressing the children at each public school in the city. Home inspection blanks were given to 5,700 students, and 5,126 of these were filled in and returned. Then followed campaigns by the plumbing and heating trades, coal dealers, electrical supplies dealers, retail merchants, bankers and building and loan associations, public utilities, etc. The local civic clubs gave

their demonstration during the month of February, and they are being succeeded by the manufacturers and the wholesalers—and so on throughout the year.

Each group, as its scheduled time arrives, displays banners and posters, uses full-page advertisements in the newspapers, or in other ways points out the folly of fire waste.

An indication of the good results so far derived from this continuous campaign may be seen in the following figures: For the past five years, for the months from September to February, inclusive, an average fire loss of $14,650 was reported, while from September, 1925, to the end of January this year, a fire loss of only $1,565 was recorded. Of this latter figure, approximately $1,000 is attributable to one fire during the month of January, the cause of which is still under investigation.



FIRE DEPARTMENT HEADQUARTERS AND LINE-UP, LACONIA, NEW HAMPSHIRE

Our experience so far has shown that not only has the interest in fire prevention failed to diminish as the months have gone by, but each successive group endeavors to make a more effective demonstration than any previously given. Groups to which dates for three months hence have been assigned, already have their plans well under way, and publicity material for many weeks ahead is printed and ready for use. Representatives of each group meet with the Fire Prevention Committee and work out the plans for their own period.

S. N. VAUGHN,
Secretary, Mansfield Chamber of Commerce.

Joint Efforts of Fire Department and Chamber of Commerce Bring Reduction in Insurance Rates

LACONIA, N. H.—As a result of splendid cooperation between our city officials and the Chamber of Commerce, Laconia now enjoys a fire insurance rate of 90 cents for five years on dwelling houses, instead of $1 for three years as formerly.

The New Hampshire Board of Fire Underwriters, as a result of a survey of local conditions, had recommended improvements in the water-works, Fire Department, and fire-alarm system. Most of these recommendations have already been carried out, including the employment of a full-time chief of the Fire Department.

A comprehensive program of fire prevention activities is now being conducted each year by the Laconia Chamber of Commerce in cooperation with the Fire Department. Fire-drills are held twice a month in each of the schools, and pupils receive instruction in fire prevention. Special training is given Boy Scouts in fire prevention, and of those participating in 1925, 45 qualified in the examinations given by fire engineers in first aid, opening hydrants, hose coupling, operating fire-alarm boxes and directing traffic at a fire.

Basements, storerooms, and alley ways are required to be kept clear of waste. Buildings are inspected each month and 85 per cent have complied with the recommendations of the Inspector. A committee has been appointed to draw up a building code, and a sufficient inspection force insures adequate supervision of new buildings. Five buildings have been equipped with automatic sprinklers, making 25 buildings so equipped in the city.

A new ordinance recently adopted by the City Council complies with the National Electric Code on wiring. Both the Chamber of Commerce and the Fire Department expect to continue recommending improvements, so that Laconia may secure further reductions in fire losses and fire insurance rates from time to time.

ARTHUR W. SPRING,
Chief, Laconia Fire Department.

Coordinating Civic Effort and Activity

OSHKOSH, WIS.—Our Chamber of Commerce has organized what we call the Oshkosh Civic Council, whose purpose is "to coordinate civic effort, to gather and analyze information on projects pertaining to community improvement, and to secure action on these projects."

The Council is at present made up of two representatives from each of fourteen organizations. These include, in addition to the Chamber of Commerce, the Rotary, Kiwanis and Lions Clubs, Trades and Labor Council, three women's organizations, and others. The representation may be increased as other organizations desire to affiliate. Although the Chamber of Commerce was instrumental in organizing the Council, its membership is on an equal basis with that of the other local organizations.

The Civic Council is committed primarily to a three-year program of work, covering the weak spots designated by the judges of the Better Cities Contest recently conducted by the Wisconsin Conference of Social Work.* In this contest the Chamber of Commerce sponsored the securing of local facts and information, which was done by ten committees with a total membership of 150, who served for a period of over four months. The

* See article "Wisconsin Fights It Out For Best City," in THE AMERICAN CITY for January, 1926, pages 61-63.

ata secured came under the following schedules: Education, Library, Recreation, Health, Religion, Industry, City Planning, City Administration, Town and Country Relations, and Social Welfare.

EDWARD R. SMITH,
Secretary, Chamber of Commerce.

Chamber of Commerce Urges Increased Assessed Valuation

JOLIET, ILL.—Realizing that modern public improvements and adequate salaries for municipal employees are more important than a low rate of assessment for taxation, the Joliet Chamber of Commerce appointed a special committee of five business men, with Theo. R. Gerlach as Chairman, who conducted an intensive investigation of the problems of financing the city government and public schools of Joliet. The committee has now published its report. As the result of a questionnaire, sent to mid-western cities somewhat comparable with Joliet in size, the following comparative statement has been compiled, showing assessed valuations and tax rates:

Name	Population of City	Assessed Valuation, City	City Tax Rate	Total Tax Rate	City Tax Income
Joliet, Ill.	39,250	$ 12,833,401	$2.25	$10.28	$ 288,751
Battle Creek, Mich.	36,164	53,504,460	1.00	3.15	535,044
Bay City, Mich.	51,000	46,969,879	1.22	5.51	573,032
Jackson, Mich.	63,000	80,258,110	.658	2.09	528,098
Kalamazoo, Mich.	55,000	75,000,000	1.10	3.17	825,000
Dubuque, Iowa.	43,000	43,605,848	1.4125	3.75	615,932
Kenosha, Wis.	50,000	58,156,660	1.40	3.10	814,193
Racine, Wis.	65,000	83,609,400	.85	2.373	710,679
Superior, Wis.	44,000	57,877,344	.94	3.24	544,047
Evansville, Ind.	85,000	120,105,930	.95	2.86	1,151,006
Gary, Ind.	80,000	131,006,810	.92	2.96	1,205,262
Decatur, Ill.	49,500	18,606,733	2.22	8.13	413,069
Rockford, Ill.	85,000	44,017,500	1.92	7.21	845,136
Springfield, Ill.	70,000	29,531,635	2.56	7.96	756,009
Average City Tax Income					$ 731,269

Among the committee's statements and recommendations, which have been accepted by the Board of Directors of the Joliet Chamber of Commerce, are:

"We favor voting such additional funds to the city as will enable it to support its various city departments on the same basis of compensation as is found in cities comparable in size to Joliet. . . . Because assessed valuation has failed to increase in proportion to the increase in real valuation of property, civic and school authorities have been compelled to levy an inordinately high tax rate. And yet, this high rate has not produced sufficient funds to run the city administration properly.

"Other Illinois cities, comparable with Joliet, have an assessed valuation two, three and four times the amount of Joliet's assessed valuation and closely approximating the actual value of property. A just regard for the good opinion of all good citizens of our great state should move us to do our share in support of our state government, along with these other cities. Our present low assessed valuation makes that impossible.

"It should also be remembered that the high tax which accompanies a low assessed valuation tends to influence industries and new wealth to look elsewhere when considering Joliet. A low tax rate is most inviting to business interests contemplating a new location.

"The above considerations cause your committee to recommend an increase as well as a readjustment in valuations, accompanied by a reduction in the tax rates."

JOLIET TAX SURVEY COMMITTEE.

A City of 15,000 That Is on a Self-Supporting Basis

PONCA CITY, OKLA.—Were it not for outstanding bonds, for which the interest money must be raised by taxation, Ponca City would have no direct taxes whatever during 1926 for its municipal government, for the city is absolutely self-supporting at the present time, with the outlook very favorable that it will continue so. There is no general fund tax for the city, but Ponca City does have the regular taxation for school, county and state.

The income of the city, which makes it self-supporting, comes in most part from the profit made by the municipal light and power department, which is handled jointly with the municipal waterworks department. There are also police court fines, and the money derived from special licenses, rental of the city auditorium for theatrical and other purposes, and the amount received from the state for general government. None of these is for any great amount, however, though the police department in itself showed a saving of $1,689.98 to the city during the last fiscal year.

The fact that the municipal light and water department, strictly on a business basis, has made practically enough profit in itself to maintain the entire city government, is of special interest, since the rates charged to the citizens of Ponca City for water and electricity compare favorably with those in other cities of this and adjoining states. There is a minimum water rate in Ponca City of $1.50 per month, with a charge of $2.50 for the first thousand cubic feet, $2.25 for the second thousand, $2 for the third thousand, the charge continuing to lessen as the amount of water used increases. It is the electric department, however, that makes the big profit. There is again a minimum of $1.50 per month, with a charge of 9 cents each above the first 15 kilowatt-hours, the charge decreasing gradually as more electricity is used. Over 2,000 kilowatt-hours the charge is 3 cents each.

The municipal government of Ponca City began working toward a self-supporting basis with the incoming of the charter form four years ago, and it has steadily advanced toward that goal ever since. During the last two years rapid headway has been made under the administration of Mayor Orville P. Callahan, who has been city manager in reality, notwithstanding the fact that it has taken the greater portion of his time and he is working without salary.

C. M. SARCHET,
Secretary, Ponca City Chamber of Commerce.

State and Local Campaign for Zoning Successful

GREENWICH, CONN.—On February 1, Greenwich adopted a zoning ordinance and map. This was the result of four years' effort on the part of the Greenwich Chamber of Commerce to secure a comprehensive state-wide zoning act and the adoption of zoning in Greenwich.

The passage of the state-wide act in June, 1925, was due almost entirely to the efforts of the Greenwich Chamber, and the zoning map and ordinance adopted by the town of Greenwich was the product of the Zoning Commission and a zoning engineer employed by that Commission. The personnel of this zoning commission is practically the personnel of the Chamber's zoning committee, which was responsible for the state-wide act.

In a talk given recently by a representative of the Russell Sage Foundation, the Connecticut zoning act was described as the most comprehensive and up-to-date act in the country.

HARRY L. NADO,
Secretary, Chamber of Commerce.

Outstanding Features of an All-Year Clean-up Campaign

NEW ORLEANS, LA.—At the annual meeting of the Association of Commerce on January 11, the Clean-up Committee, which had been functioning continuously during the year, was able to report the following outstanding features of its work:

1. Perfected a city-wide organization with over 2,000 personally pledged workers.
2. Induced the city to commit itself to the policy of a cleaner New Orleans.
3. The actual removal of hundreds of tons of accumulated trash and débris from the yards and homes of citizens at an extra cost to the city of over $6,000.
4. Carried on a sustained publicity campaign over a period of several months with aid of Publicity Department.
5. Induced Civic Department of the Federation of Clubs to sponsor and carry forward an intensive clean-up campaign during the summer.
6. Incidentally committed the Police Department to a stronger policy of enforcing the long-neglected sanitary ordinances.
7. Actual removal to the dumps or junk shops of over 200 wrecked automobiles from the streets of New Orleans was effected.
8. Secured assent of over 10,000 householders to purchase regulation garbage cans in compliance with law.
9. A material check on the unlawful encroachment on sidewalks by merchants in the business section was made.
10. City Recorders agreed to impose fines when violations are reported.
11. A sustained drive against the practices of newsboys who littered the prominent street intersections with paper.
12. A visible check on the presence of beggars was made.
13. The realization of the committee and the Association of Commerce that much hard work lies ahead of them.
14. Organized the largest force, and the longest sustained battle, against dirt in any American city to date.
15. Established a contact between the Association of Commerce and leading civic organizations and leaders in the city.
16. The City Administration agreed that ways and means will be at once devised to erect a full complement of incinerators and to completely remodel and improve the garbage collection and disposal system.

First American Health Congress to Be an Important Event

WORD has just been received by the National Health Council, 370 Seventh Avenue, from Sir Arthur Newsholme, K. C. B., M. D., F. R. C. P., accepting the Council's invitation to address the American Health Congress to be held at Atlantic City, May 17-22. Familiar with public health conditions in his own country from his forty years of experience and also well versed in American methods, Sir Arthur Newsholme will give a message that will be welcomed by the thousands of public health workers that will be gathered together.

Dr. George E. Vincent, President of the Rockefeller Foundation, will speak on the international phases of health work.

Professor C.-E. A. Winslow, President of the American Public Health Association, will speak at one of the general sessions of the Congress, where the administrative side of state and city health work will be stressed.

"Is Public Health Improving the Race?" is the piquant title chosen by Dr. Ray Lyman Wilbur, President of Stanford University, for his address.

Many other speakers renowned for their work in the different branches of public health will complete this program, making it a memorable step in the development of public health in America.

This Congress marks the five years of cooperation between the great voluntary national health organizations forming the National Health Council and for the first time in history will bring together those engaged in the many different phases of the work: prevention and cure of tuberculosis; control of cancer; care and cure of heart disease; immunization; nursing; child health; maternity care and education: health education; the prevention of blindness; social hygiene; mental hygiene; Red Cross activities; and public health administration.

The organizations to be represented are: American Child Health Association; American Heart Association; American Public Health Association; American Red Cross; American Social Hygiene Association; American Society for the Control of Cancer; Conference of State and Provincial Health Authorities of North America; National Committee for Mental Hygiene; National Committee for the Prevention of Blindness; National Organization for Public Health Nursing; National Tuberculosis Association; United States Children's Bureau; United States Public Health Service; Women's Foundation for Health; the American Nurses Association; National League of Nursing Education; Conference of State and Provincial Health Authorities of North America.

BEFORE THE "FILLING IN" WAS STARTED

Development of Trenton's Park System

AMONG cities throughout the United States showing notable improvements in their recreational facilities, Trenton, N. J., occupies a prominent place. The present area of park lands in Trenton is about 250 acres, with an assessed valuation of $1,600,000.

Important among the recent developments is Mahlon Stacy Park, stretching along the river-front and in most part made up of reclaimed land from the bed of the Delaware River. This project had its beginning in 1910 when, at the suggestion of several prominent men, principal among whom was the late General Wilbur F. Sadler, the city, in cooperation with the state of New Jersey, constructed a retaining wall along the river-front. With the aid of several years of filling processes, the site to-day presents a park that is rivaled by few river-front developments.

The major improvements have been made in accordance with a plan prepared by Charles Wellford Leavitt, landscape engineer, of New York City. For the "before and after" views here shown THE AMERICAN CITY is indebted to Walter O. Lochner, Secretary of the Trenton Chamber of Commerce.

Other new parks in Trenton that are recent developments under the regime of George W. Page, the present Director of the Department of Parks and Public Property, are the North Trenton Park, a development consisting of some seven acres, produced at a cost of approximately $70,000, and Franklin Park, consisting of about five acres of improved lands at a cost of approximately $25,000.

MAHLON STACY PARK AS IT IS TO-DAY

A "Through Street" Can Become an Accident Menace Unless Properly Established and Used

By Earl J. Reeder

Engineer, Public Safety Division, National Safety Council, Chicago, Ill.

UNDER proper conditions, the designation and use of a main traveled thoroughfare as a "through street" may be a blessing to a community. Improperly established or wrongly used, a "through street" can become an accident menace of no small proportions. Established where it is not needed, it becomes an aggravation, often neither dangerous nor useful.

Many claims have been made for through streets, and, under the urge of these claims, many cities, large and small, are clamoring for more and more of them, often without realizing the responsibilities which they impose if they are to be used in safety. This article is not intended to discourage the designation of through streets where they are needed; rather, it is intended to point out some of the precautions that should be observed with respect to this much-used and oft-abused traffic facility.

Some like to think of the through street as a thoroughfare that is immune to traffic regulation and where "the sky is the limit" on speed, right of way, and special privilege. They like to look upon it as an avenue of travel on which the term "traffic violation" loses all of its meaning. In reality, however, it is a street that requires more regulation and supervision per unit of length than any other outside a congested business district.

To Avoid Confusion in Terms as Well as in Traffic

Editorial Note.—"Arterial highway," "boulevard," "stop street," and "through street," are terms which have come into use in various cities to designate a thoroughfare which vehicles are permitted to enter or cross only after coming to a full stop. It is the opinion of Sidney J. Williams, Director, and Earl J. Reeder, Engineer, of the Public Safety Division of the National Safety Council, and of the editor of The American City, that the terms "arterial highway" and "boulevard" are more properly used as referring to certain types of thoroughfares regardless of the method of traffic regulation employed on them; and that confusion in terms as well as in traffic would be avoided by the general adoption of the term "through street" to designate a thoroughfare to which the method of traffic regulation described in the accompanying article has been applied.

Through Street Should Not Be Made "Right-of-Way" Street

In the first place, a through street should never be established as a "right-of-way" street. Being a more heavily traveled street than those intersecting, it is sensible to require that vehicles enter from the latter with extreme caution, and hence the "stop" requirement is established. Having come to a full stop, however, drivers on intersecting streets

should not have to await the pleasure of individual drivers in an endless line of traffic for an opportunity to cross or enter the through street in safety.

Drivers on through streets should learn to consider that vehicles proceeding into those highways after having stopped, must be permitted to do so in safety. This should be made clear when the street is first designated a through street. Proper publicity should be given to its real status before the "through street superiority complex" has been established among the drivers of the community, particularly those who are privileged to use it most.

The importance of this is emphasized by the great numbers of property damages, personal injuries and fatal accidents that occur along through streets where their proper status is not thoroughly understood and fully emphasized. It is not uncommon along these streets to see cars creeping slowly into them after having made the required stop, with several cars sweeping past them, escaping collisions, if at all, only by the narrowest margin. It is this disregard of the rights of those entering or crossing these streets (both vehicles and pedestrians) that makes it necessary to establish traffic control at certain intersections, as explained later. This cannot, of course, be permanently avoided in increasing traffic, but it certainly can be delayed when drivers on these streets observe the rights of others.

Importance of Signs and Pavement Markings

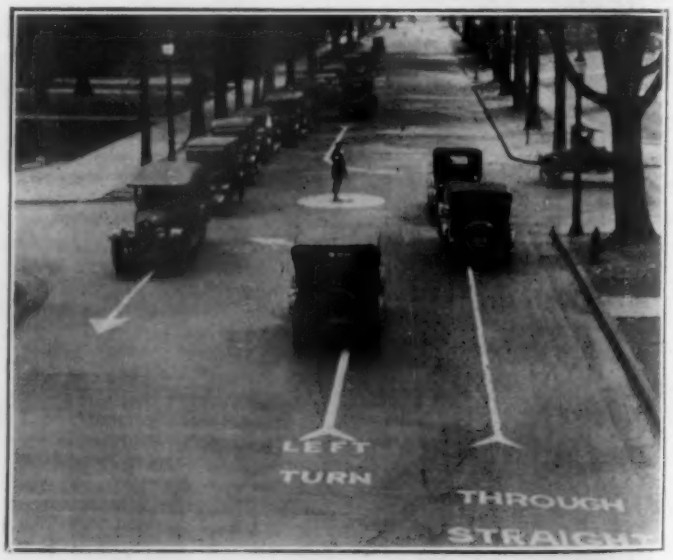
The second requirement is that a through street shall be properly and conspicuously marked at *every* intersection, before its status has become effective. Drivers cannot be expected to remember the stop requirements at every street intersection throughout a city, and it becomes necessary to provide proper reminders at those intersections where such stop requirements are imposed. All too frequently through streets are poorly marked and drivers may innocently proceed into them without stopping, at the risk of serious accident.

For this purpose both signs and pavement markings, calling attention to the stop requirements, are essential along through streets. Both should be of a standard type used throughout the community and should be so arranged and located that their full meaning is conveyed without confusion. Both should be specially illuminated, if necessary, so that the same message will be equally apparent, both day and night.

The messages on the signs should be brief and clear. "STOP—Through Street" is recommended. More than this or a similar text is usually unnecessary and confusing. If at all practical, these signs should be made to conform to approved standards adapted by national organizations working on the problem of standardization. All signs should be properly maintained, particularly as to painting and lettering; for if a "stop" sign has been allowed to deteriorate or is placed without proper illumination, the driver may find himself almost into a through street before he realizes what it is. For this same reason, these signs should be located so that there is plenty of time to stop after the sign has been observed, before the arterial highway is reached.

Pavement markings should be used at the intersections of all paved streets with the arterial highway. These usually consist of painted or inlaid lines extending from the right curb to the center of the intersecting street, at the property line, with the word "STOP" painted or inlaid a few feet in advance.

These markings are exceedingly important, as they come directly in the line of vision of the driver as he approaches the arterial high-



PAVEMENT MARKINGS SUCH AS THESE REDUCE ACCIDENTS AT INTERSECTIONS

way. There is, consequently, no excuse for his failure to obey the "stop" requirement. Of course, the painted markings must be kept clearly defined by repainting at necessary intervals. At certain times in the year pavement markings are not effective in some sections of the country because of snow upon the pavements. This makes it necessary to have both the pavement markings and the signs at the same intersection.

Motor-Cycle Policemen Necessary for Right Enforcement

The third essential is that of rigid enforcement of the "stop" requirement and of all regulations in force regarding the through streets. Enforcement of the former is greatly assisted by the signs and pavement markings discussed above. The regulation of speed and the prevention of reckless driving on those streets is an important matter, because driving conditions encourage considerable liberty in these directions, at the expense of pedestrians and vehicles desiring to cross or enter the street. When a through street is established, therefore, the use of motor-cycle policemen for patrolling these streets to prevent speeding and reckless driving should be considered immediately necessary.

In recent studies in several cities the need for such enforcement was greatly emphasized by the large numbers of accidents that occurred on newly improved through streets where conditions were favorable to high speed and recklessness. On one street, patrolling by motor-cycle police was immediately followed by material reduction in the number of accidents.

Traffic Control by Officers or Automatic Signals

The fourth requirement is that of traffic control at the important intersections along the through street. This serves two important purposes. It gives the vehicles and pedestrians on the intersecting streets an opportunity to cross without disturbance. At the same time, it causes the traffic on the through street to move in groups, thus giving pedestrians and vehicles on intersecting streets, even several blocks away, an opportunity to cross in safety without undue delay.

This traffic control may be provided by either officers or automatic signals, there being little difference, from a safety standpoint, between the two. However, the former has the advantage of some elasticity in the period of flow in each direction, making it possible to adjust the time to the amount of traffic. The latter has the advantage of coordinating the control at various intersections upon a progressive basis, so that when vehicles are thrown into the groups by the first signal encountered, they proceed along the street without interruption if an approximately standard speed is maintained, getting to each signal along the street as the "go" light is displayed. Thus the signals may serve to regulate speed, as well as to control the direction of movement.

Preparation and Moderation

It is highly important that all of the four preceding requirements should be arranged for or complied with before the street is legally made a through street. If this is not done, dangerous habits and false impressions regarding the use and function of the street are likely to be established, making it particularly difficult to handle the traffic properly.

When a through street is needed and the community is willing to pay the price to provide its requirements for safety, direct benefits in traffic movement and safety may be expected from the orderly movement of traffic that will result from it. Where, however, proper preparation has not been made, traffic violations, confusion and accidents may be expected. In any event, too many through streets impose an unnecessary burden on the community and seriously hamper the movement of traffic in streets intersecting them. Hence, moderation should be exercised in establishing these highways and, from a safety standpoint, they should be established only when all the conditions are in readiness for them.

THE BUILDERS AND THE CITY

The picture once painted or the poem sung, it stands henceforth by itself; the artist can do no more for it. It must live or die without further help from him. But the city is never thus entirely separated from us, its builders. It remains tied to us by the invisible cord of nourishing passions. It grows with us or it dies with us. It is in a more real and personal sense a part of us, as we are of it. It becomes then the reflex of the lives and aspirations of the people who dwell in it. So that a city—its streets, its highways, its buildings, its public places, as well as its business and life— is an embodiment of ourselves. It is this living spirit that may hearten and inspire us; that may delight and enchant us, and that may also break and destroy us.—Temple Scott.

Forward Steps in Municipal Affairs

Cards and Posters Reduce Jaywalking

CLEVELAND, OHIO.—The distribution of cards to pedestrians and school children has had fine results in reducing jaywalking in Cleveland.

We first ordered 150,000 cards on the face of which was the following warning:

> WARNING
>
> You have violated a traffic signal rule. Do not cross street except when the light is green, which means "Go."
>
> For your own safety and the safety of others, help us enforce all regulations.
>
> Traffic Division
> Cleveland Police Department

The back of the card contained the following advice:

> TO AVOID ARREST
>
> Cross streets only at intersections.
>
> Never cross streets diagonally.
>
> Follow traffic signals whether walking or driving.
>
> Look to the left and right when crossing streets.
>
> Follow these rules and avoid arrest.

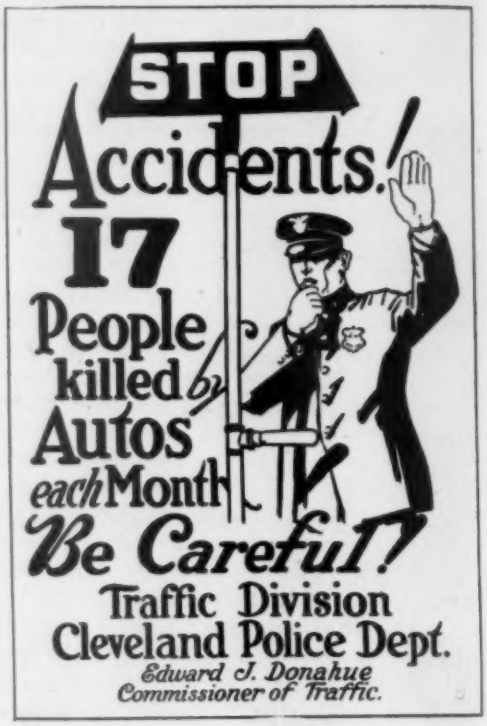
After the plan had been given publicity through the newspapers, a supply of the cards was handed to each of our down-town corner men for distribution. This resulted in additional publicity. After the cards had been distributed, we made a few arrests, which with $9 fines cut down jaywalking amazingly.

Then, for the benefit of school children, we had 200,000 additional cards printed and worded a little differently. These were distributed through the Board of Education. The Board instructed teachers to lecture children on the meaning of the cards. We believe the results repaid the department, although we have no concrete way of establishing just what good was done. Police captains talked on traffic to every class in their districts.

Local oil companies cooperated in placing 1,000 posters at every gasoline filling station in the city. These posters called attention to the high death-rate and brought much favorable comment. In placing these posters at gasoline filling stations, we felt we were placing them before every motorist in the city.

We are very well satisfied with the results obtained from the use of these advertising methods and contemplate something similar during the coming months.

EDWARD J. DONAHUE,
Commissioner of Traffic.



POSTER USED IN CLEVELAND CAMPAIGN

Camden Asks Its Namesakes to Convene

CAMDEN, N. J.—Twenty-one mayors of twenty-one Camdens scattered over twenty-one states have been invited to attend the celebration, on July 4, 1926, which will mark the opening of the bridge over the Delaware connecting Camden, N. J., with Philadelphia. There are many designations common to various numbers of communities, but this is believed to be the first time the executive heads of every community having the same name have been asked by the largest city in the group to join a "family gathering."

Invitations to this unique gathering have been sent from the Mayor's office of Camden, N. J., to the Mayor of Camden in each of the following states: Alabama, Arkansas, Delaware, Georgia, Illinois, Indiana, Maine, Michigan, Minnesota, Missouri, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, West Virginia, Washington.

The letters ask the recipients to join New Jersey's Camden in the Bridge Celebration to the end that fitting honor be done to a name so frequently chosen by the founders of the communities. The idea suggested is that each of the executive heads present to Camden, N. J., a young tree from his home town. These trees would be planted on each side of one of the boulevards which will

traverse the Civic Center where the Exposition will be held. This highway will be named the "Avenue of Camdens" and the trees will be planted in the presence of the twenty-one mayors, each sapling bearing the name of the town from which it came. With twenty gift trees and one from Camden, N. J., there will be one in memory of Lord Camden, a distinguished English jurist of colonial times, from whom the Camdens in the United States have taken their name.

Search shows that only two names are used by more separate communities in this country than that of Camden. Twenty-four communities bear the name "Springfield," and an equal number have the appellation "Warren." But there is no record of the executive heads of these groups of twenty-four ever having been invited by one of their number to join in "a family gathering" to honor the joint name.

VICTOR KING,
Mayor.

Village Earns Lower Fire Rates

DEPOSIT, N. Y.—In both the residential and business sections of the village of Deposit, a reduction in the basic rates for fire insurance is being enjoyed as a result of the community's improved fire-fighting equipment and the adoption of a modern building code.

Two years ago the mercantile and residential rates for fire insurance in this village were increased to CC rating owing to the failure of the taxpayers to approve a proposition providing for additional fire apparatus. The effect of this rate increase was seen when a similar proposition for improvements, put to the vote by the Village Board at a later date, received the required majority vote. In the meantime, a modern building code, to become effective at once, had been adopted by the Board.

Following the vote to increase the fire-fighting facilities of the village, a contract was placed with the Buffalo Fire Appliance Corporation for a triple-combination motor 350-gallon pumper. This truck, after having passed the necessary tests and being approved by the New York Fire Insurance Rating Organization, was accepted by the village in August, 1925. Shortly thereafter a reduction in fire insurance rates for Deposit was authorized.

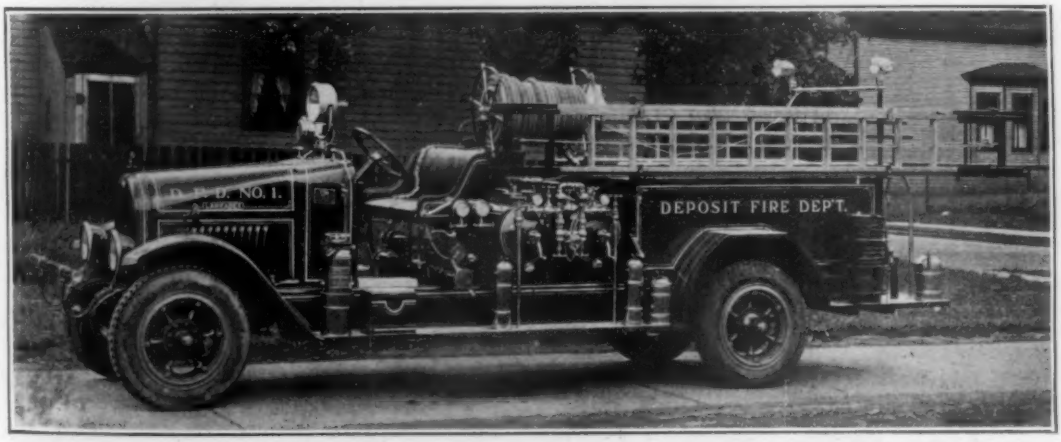
H. W. SMITH,
President, Village of Deposit.

"Swinging Light" Safety Signal

TREBEINS, OHIO.—At a double railroad crossing at Trebeins, an installation of the Pennsylvania Railroad standard highway crossing signal has been operating very satisfactorily for more than a year, warning autoists of the approach of trains.

This safety signaling device is of the flashing light type, employing two red lenses of special construction on a horizontal line with each other, about two feet apart, mounted on an iron mast about seven feet above the ground. Twelve-volt electric light bulbs are placed back of the red lenses, and the circuits are so arranged that the signals are dark except upon the approach of a train. A flashing relay is cut into the circuits in such a way as to illuminate first one lense and then the other, so that to the approaching autoist the signal has the appearance of a swinging red light. The lights continue to flash until the rear of the train has passed the crossing. Each electric light bulb is on an independent circuit so that one light may fail without interfering with the other, and should the electric power line fail, a storage battery automatically cuts into the circuits.

DILVER BELDEN,
Secretary, Green County Automobile Club.



DEPOSIT'S NEW FIRE-FIGHTING EQUIPMENT

Recommendations for Improvements in Hometown's Fire Protection

Which, If Properly Executed, Will Entitle Hometown to a Better Classification for Fire Insurance

By R. M. Cadman

Superintendent, Engineering Department, Schedule Rating Office of New Jersey

Water-Supply

1. That the permanent records of the Water Department include a complete record of pumpage, height of water in stand-pipe, consumption, extensions and repairs to the distribution system, and map showing mains, gate-valves and hydrants.

2. That all gate-valves be inspected at least once each year, and record of inspection kept.

3. That all hydrants be placed in good condition and inspected at least twice annually.

4. That it be part of the regular duty of an employee of the Water Department or company to respond to all second-alarm fires and be prepared to render emergency service.

5. That the threads on all hydrants be made to conform to the National Standard Thread.

6. That all hydrants installed in the future have two 2½-inch and one 4½-inch outlet, 6-inch barrels, and 6-inch gated branches.

7. That 6-inch pipe be adopted as a minimum size for street mains supplying hydrants.

8. That the distribution system and/or main supply line be reinforced so that the fire flow, in excess of the maximum consumption, will be as follows:

(a) In outlying residential sections, ——— to ——— gallons per minute.

(b) In more closely built-up sections, ——— to ——— gallons per minute.

The above quantities to be available at a residual pressure of 50 pounds.

9. That where possible all dead ends be either eliminated or reduced in length.

Fire Department

10. That the entire Fire Department organization, equipment, and house be under the control of the municipality.

11. That an ordinance be enacted providing for the control and governing of the department by the municipality.

12. That the personnel of each company include at least twenty members, of which not less than ten should be available for fire duty during the daytime.

13. That the engine and hose-cars carry at least 1,000 feet of 2½-inch hose and the following minor equipment: two axes, two brooms, one Cooper burst-hose jacket, one crowbar, one door-opener, twelve gaskets, two pairs rubber gloves, six hose straps, four hydrant wrenches, four lanterns, one nozzle holder, two plaster hooks, two play pipes with shut-off nozzles, 100 feet of one-inch rope, one Siamese connection, 12 spanners, and one

Intelligent Action on Expert Advice

Realizing that poor fire protection and high insurance rates go hand in hand, far-sighted municipal officials are profiting by the constructive advice available from the various inspection bureaus, rating offices, and insurance exchanges throughout the United States. To secure definite examples of such cooperation, The American City recently requested information as to recommendations made, and as to a few instances of how small cities have been able to secure lower insurance rates and reduce their fire losses as a result of following such recommendations.

In reply, the Schedule Rating Office of New Jersey, at Newark, N. J., sent what might be called a composite set of recommendations covering in a general way improvements suggested to various small municipalities in New Jersey, the carrying-out of which has enabled the Schedule Rating Office to give them an improved classification for fire insurance rates. This set of recommendations is here published, and replies from other inspection bureaus will appear in subsequent issues.

Municipal officials and civic organizations which have not yet had surveys made by the fire insurance rating bureau or similar organization serving their city, will find a list of such bureaus, together with a map of the territory covered by each, in the issue of this magazine for March, 1925, pages 329-331.

surgical kit.

14. That the minor equipment on the ladder truck include the following: Four bale hooks, two brooms, one Cooper burst-hose jacket; one crowbar, one door-opener, twelve gaskets, two axes, two pairs rubber gloves, six hose straps, two lanterns, one nozzle holder, two plaster hooks, 100 feet of one-inch rope, and one surgical kit.

15. That a duplicate supply of hose be provided equal to that on the apparatus.

16. That hose on apparatus be shifted at least every thirty days and have water run through it at least every second month, unless otherwise used.

17. That the threads on all hose be made to conform to the National Standard.

18. That all hose be tested before acceptance at 200 pounds pressure and annually at 150 pounds pressure.

19. That after use at fires and drills all hose be thoroughly washed and dried.

20. That a drill school be established and that drills including the following be held monthly: handling and use of ladders; quick handling, laying, and raising of hose; use of Siamese connections and all other appliances on apparatus and modern fire methods.

21. That a complete record be kept of all alarms of fire, fire losses, method of extinguishment, drills, hose, apparatus, minor equipment and starting of motor.

Fire-Alarm System

22. That in the future, boxes of the non-interfering succession type be installed with platinum or silver sliding contacts, with glass panel door or door with key under glass guard, with boxes painted red mounted on poles having a band of white paint where box is attached to pole, extending at least 2 inches above and below the box, and a band of red painted above the white band at least 12 inches wide, and the remainder of the pole between the white band and the ground to be painted red; not more than twenty boxes and instruments to be attached to any one circuit; boxes to be located on street corners so that the distance from any point to a box in the mercantile districts is not more than 500 feet and elsewhere 800 feet.

23. Records to be kept of all tests and inspections of boxes and circuits, of all troubles, of all repairs and extensions, and of all alarms.

24. A wall map to be provided showing the location of all boxes, instruments and circuits.

Building Laws

25. That the building code be revised to conform more closely to the "Code of Suggested Ordinances for Small Municipalities," prepared by the National Board of Fire Underwriters, with suitable provision for enforcement.

26. That a code be adopted regulating the handling and storing of explosives and inflammables with suitable provision for enforcement. It is recommended that the "Code of Suggested Ordinances for Small Municipalities," prepared by the National Board of Fire Underwriters, 76 William Street, New York, be used as a guide in framing such a code.

City Managers and the Merit System

AT the annual meeting of the National Civil Service Reform League, held in New York, January 12, 1926, the report submitted by the Council of the League contained the following comments on the relationship of the merit system to the city manager form of government.

"Among the large and growing number of city managers there are individuals who deem the merit system to be destructive of efficiency and inimical to the application of business methods to municipal government. Appointments without the help of the sifting process of the merit system are bound to result in disaster, no matter how eager the appointing officer may be to avoid it, for, excepting in the small cities, he cannot know all nor any considerable part of his appointees. While mayor of New York, Seth Low discovered that an appointee to a position in the comptroller's office, which he had caused to be exempted from the list of the merit system, was a jail-bird. The defalcations in the office of local treasurers in the Philippine service when Taft was Governor-General were confined to those treasurers who were exempt from the test of the merit system.

"A city manager needs a good civil service law as a means of procuring expeditiously competent and expert help. Its value as a bulwark against the spoils system is beyond question. It is assumed by many advocates of city manager government that upon its adoption by the municipality, political interference in the administration of the departments of the municipal government automatically disappears. Nothing could be farther from the truth. The pressure of local political organizations may increase or diminish as public opinion asserts itself. But a popular vote on the adoption of city manager government does not automatically subdue the spoils system, and the city manager therefore requires a strong civil service system above all else. The League commends to city managers the principles of the merit system as essential to their own salvation."

Early English Laws for Highway Safety

By G. Cameron Parker
Departmental Secretary, Ontario Department of Public Highways

PROBABLY the first law relating to highways and for the protection of the traveling public was that of 1285, passed in England, which provided that "all trees and shrubs must be cut down for a distance of 200 feet on either side of the roads between market towns, to prevent the concealment of robbers in them." While laws relating to roads were on the statutes of Great Britain from the fifteenth century, apparently no attention was paid to laws relating to vehicular loads until the passing of the General Turnpike Acts of 1822 and 1823.

In the light of our present laws restricting vehicular loads, it is extremely interesting to review the provisions of these early acts. Their main clauses provided for the maximum loads that could be carried by vehicles with tires of various widths. For example, wagons with 9-inch tires were restricted to a gross load of 14,440 pounds, or a weight of 400 pounds per inch width of tire; those with 6-inch tires could carry 10,460 pounds, or 436 pounds per inch width of tire. Carts with two wheels were restricted to tire weights of from 450 to 500 pounds per inch width. All of these load limitations were for wagons and carts without springs. For vehicles built with springs, an additional load of 9,460 pounds was allowed. Two principles were therefore fully recognized at this early date. In the first place, the damage resulting from overloading was appreciated, and, secondly, the advantage of loads carried on springs over unsprung loads, as far as the effect on the road was concerned, was realized. The use of springs was encouraged by a substantial increase in allowable loads.

Another feature of the Turnpike Acts was the requirement for reduced loads during the winter and spring months. From November 1 to April 30, the allowable loads were reduced to the extent of from 6 to 16 per cent as compared with the remainder of the year. It is rather remarkable that this provision was enacted a century ago, and some 90 years before similar laws on this side of the Atlantic.

What appears to be the first law relating to travel on the statutes of Britain was embodied in the Towns Police Clauses Act of 1847. While certain local powers were conferred upon urban authorities, such as the regulation of stage coaches, limiting the hours during which drivers of hackney carriages might "exercise their calling," and for licensing and fixing the fares to be charged by such, a number of regulations governing the use of streets and roads not only by vehicles but also by pedestrians and residents were included. The first rule of the road that appeared in British statutory law was that which imposed a penalty on every person who:

" . . . having the care of any waggon, cart, or carriage rides on the shafts, or without having reins, and holding the same, rides upon such waggon, etc., or on any animal drawing the same, or is at such a distance as not to have due control over every animal drawing the same, or who does not, in meeting any other carriage, keep his waggon, etc., to the left or near side, or who in passing any other carriage does not keep his waggon, etc., on the right or off side (except in cases of actual necessity, or some sufficient reason for deviation), or who by obstructing the street, wilfully prevents any person or carriage from passing him or any waggon, etc., under his care; or rides or drives furiously any horse or carriage, or drives furiously any cattle."

It is to be remembered, that the British law is primarily based on custom and that while such a fundamental principle as turning out to the left on meeting an approaching vehicle, did not become a legislative enactment until 1847, it had undoubtedly been established by custom years before.

Laws are developed as occasion requires; they are founded on firmly etablished customs, and are changed and extended as a result of continual progress in human endeavor. In Britain, which saw the earliest advances in mechanical propulsion, the invention and use of the steam carriages or steam wagons, brought a public demand, crystallized in the form of statutory law, for the control of this new type of traffic. Among other less important provisions, the Locomotive Act of 1861 required that:

"The drivers of locomotives give as much space as possible for the passing of other traffic."

"Every locomotive be instantly stopped on the person preceding the same or any other person with a horse or carriage drawn by a horse, putting up his hand as a signal to require the locomotive to be stopped."

"Any person in charge of a locomotive to provide two efficient lights to be affixed conspicuously, one at each side on the front of the locomotive."

We find the foregoing three fundamental regulations are to-day, with little or no qualification, incorporated in the road laws of every state and province.

The City's Legal Rights and Duties

Conducted by A. L. H. Street, Attorney at Law

Unreasonable Provisions in Building Codes

To justify public authorities in imposing restrictions upon the owners of private property in erecting buildings, "it must appear: first, that the interests of the public generally, as distinguished from those of a particular class, require such interference; and, second, that the means are reasonably necessary for the accomplishment of the purpose, and not unduly oppressive upon individuals. The Legislature may not, under the guise of protecting the public interests, arbitrarily interfere with private business, or impose unusual and unnecessary restrictions upon lawful occupations. In other words, its determination as to what is a proper exercise of its police power is not final or conclusive, but is subject to the supervision of the courts."

This test of the validity of police regulations was laid down by the highest court of the land in the case of Lawton vs. Steele, 152 United States Reports, 133. In the case of McCray vs. City of Chicago, 126 Northeastern Reporter, 557, the Illinois Supreme Court followed it, and decided that a Chicago ordinance, prescribing wood and plaster of certain thickness and quality in dwelling rooms in buildings, was unjust and oppressive in its discrimination as to material to be used in ordinary dwellings. The Court said:

"The validity of the ordinance here in question on this record must be determined by its operation with respect to its exclusion of the use of Preferred Bestwall 3/8 of an inch thick and not by the desirability of preventing the use of Beaverboard, Sackettboard, or any of the numerous paper or wall boards less than 3/8 of an inch thick, regardless of how desirable or undesirable any of those boards may be. The proper way to reach the evil is to regulate the use of wall boards and not to suppress their use."

In the case of Commonwealth vs. Corson, 36 Pennsylvania Superior Court Reports, 7, it was held that in the absence of legislative authority, a borough has no power to enact an ordinance applicable to the entire borough and undertaking to specify a uniform standard of construction for every building to which it applies, thereafter to be erected in the borough, whether the building is large or small or cheap or costly. In the same case it was ruled that an ordinance regulating the construction of buildings cannot be upheld where it is impossible to determine from the ordinance, with anything like legal certainty, just what kind of buildings are intended to be prohibited.

In the case of Crossman vs. Galveston, 247 Southwestern Reporter, 810, it was decided by the Texas Supreme Court that a building having been lawfully erected before its locality was included within municipal fire limits, it could not, merely because of wooden construction, be forbidden to be repaired unless the repair should amount to a substantial reconstruction of the building. The Court said:

"In so far as this ordinance denies the plaintiffs in error the right to repair their wooden building, lawfully erected prior to the inclusion of the territory in which it is located within the fire limits of the city it takes their property without due process of law, and is null and void.

"Since it is clear that the owners of a building lawfully erected have a vested property right in the building, it necessarily follows that they have the right to repair the building so as to keep it fit for use."

Supporting this conclusion, the Court cites decisions to the same effect rendered by the Courts of North Dakota, Indiana, Missouri, Pennsylvania, Colorado, New York, and New Jersey.

One of the essential elements of a valid building regulation is certainty. So, it was decided by the Connecticut Supreme Court of Errors in the case of State vs. Clarke, 69 Connecticut Reports, 670, that an ordinance requiring that awnings over sidewalks be on "suitable frames" was void for uncertainty. The Court remarked:

"The ordinance does not prohibit all awnings, but only those which do not conform to its requirements. It permits awnings under certain conditions, and, in effect, it punishes as a crime the erection or use of awnings which fail in any way to comply with these conditions. This being so, the conditions ought to be stated with such reasonable certainty that the man of ordinary intelligence may with reasonable efforts understand them, and be able to guide his conduct by them."

That standards of construction are not to be adopted by mere reference to those adopted

by some other body is shown by the decision of Massachusetts Supreme Judicial Court, handed down in the case of Cawley vs. Northern Waste Company, 132 Northeastern Reporter, 365. It was there decided that an ordinance requiring electric wiring to conform to the rules of the National Board of Fire Underwriters was void. The Court declared that there was nothing in the Massachusetts statutes empowering "a city council to adopt by mere reference the rules and regulations of another and foreign body as the basis for determining the suitableness or safety of the insulation, attachments, supports or appliances for wiring."

Schedule of Patronage, Facilities and Administration for a Water-Front Park

From a Recent Report to the Nassau County (N. Y.) Committee on the Development of Jones Beach, Long Island, as a Great Ocean Park

By Charles Downing Lay
Fellow, American Society of Landscape Architects

I. THE PATRONS—classified according to:
- A. The use they will make of the Park
  - 1. Campers
    - a. Private Parties
      - (1) Families
      - (2) Bachelors
    - b. Associations, Organizations, Clubs
      - (1) Men
      - (2) Women
      - (3) Girls
      - (4) Boys
  - 2. Day Visitors
  - 3. Hospitals, Convalescent Homes
  - 4. Transients in Hotels
- B. Means of access to the Park
  - 1. By Private Motor
  - 2. By Motor Bus
  - 3. By Train
  - 4. By Ferry or Steamboat

II. ACCOMMODATIONS—What the Park will offer the Public
- A. Service accommodations
  - 1. Camp Sites
    - a. For Private Parties
      - (1) Motor Camps
        Allotments with boundary demarcation, fireplace, places for tent and car, water-supply and toilet facilities. An exclusive athletic field for each group of camp sites. Areas of 100 acres, to contain 2,000 individual sites
        Separate areas for
        (a) Families
        (b) Bachelors
      - (2) Non-motor Camps
        Same as above, but without provision for cars; in areas from which motors are excluded
    - b. Associations, Organizations, Clubs; Building groups containing Dormitories, Meeting Rooms, Mess Hall, Kitchen, Toilets; Council Fire; Athletic Field; Boat House
  - 2. General Service Provisions for All Classes
    - a. Automobiles
      - (1) Parking spaces
      - (2) Garages
      - (3) Service and Supplies
    - b. Comfort Stations
    - c. Train and Ferry Sheds
    - d. Docks and Covered Piers
    - e. Picnic Grounds—Tables and Benches
    - f. Lunch Rooms and Restaurants
    - g. Stores for the purchase of
      - (1) Supplies
      - (2) Food
      - (3) Equipment
- B. Recreation
  - 1. Bathing
    - a. Surf
      Bath houses
      Canvas shelters
      Diving floats
      Life lines, etc.
    - b. Bay
      Pool for contests in swimming and diving with appropriate grandstand and dressing rooms
      Instruction pool
  - 2. Boating and Canoeing
    - a. Bay
      Boat houses, docks, floats, launches, boats, equipment
    - b. Lagoon
      Rowboats, canoes, canoe houses, floats, etc.
  - 3. Fishing
    Use of docks and boating facilities
    Equipment; supplies
  - 4. Athletics and Games
    - a. Outdoor Gymnasium
    - b. Track and Football Field
    - c. Tennis
    - d. Baseball
    - e. Basketball
    - f. Handball
  - 5. Children's Playgrounds . Equipment and apparatus
  - 6. Parks and Grounds
    - a. Promenades—"Boardwalk"
    - b. Groves
    - c. Ornamental Grounds
  - 7. Auditorium for Music, Movies, Theatre
  - 8. Dance Halls on Piers and elsewhere
  - 9. Band Stands

III. ADMINISTRATION
- A. Chief Executive Office
  - 1. Coordination of all Departments
  - 2. Employment and Personnel Life Guards, Bath House Attendants, etc.
- B. Police
- C. Superintendent of Grounds
- D. Sanitation
  - 1. Sewage disposal
  - 2. Garbage collection
  - 3. Street cleaning
- E. Department of Water, Gas and Electricity
- F. Local Transportation
  - 1. Busses
  - 2. Wheel Chairs, etc.
- G. Commissary Department
  - 1. Supply Depots for Camps and Picnics
  - 2. Lunch Rooms and Restaurants
- H. Automobile Department—Having supervision of:
  - 1. Parking and Storage
    - a. Outdoor Parking Spaces
    - b. Garages
  - 2. Service and Supplies
- I. Concessions
  - 1. Service and Supplies of all kinds
  - 2. Amusements
  - 3. Hotels
- J. Director of Amusements—Supervision of:
  - 1. Music
  - 2. Movies
  - 3. Dancing
  - 4. Theatre
- K. Emergency Hospital
- L. Post Office
- M. Department of Plan and Extension
  - 1. Location and Layout of land reclamation, roads, camp sites, athletic fields, and all other features
  - 2. Bureau of Contract and Construction

Zoning Notes

Prepared by Frank B. Williams
Author of "The Law of City Planning and Zoning"
From data collected by the Zoning Committee of New York (233 Broadway)
Mr. Williams may be addressed in care of THE AMERICAN CITY, 443 Fourth Avenue, New York

Recent Zoning Enabling Acts and Ordinances

PINE BLUFF, ARK.—Ordinance, 1925
PETALUMA, RIVERSIDE, SANTA CLARA, CALIF.—Ordinance, 1925
SAN GABRIEL, CALIF.—Ordinance, 1922
VISALIA, CALIF.—Ordinance, 1924
FLORIDA.—Enabling Act, Laws 1925
JACKSONVILLE, FLA.—Ordinance, 1925
GEORIGA.—Enabling Acts;—
1925, No. 280, Counties having not less than 200,000 inhabitants; 1923, No. 303 Sec. 34 (8) Albany; 1925, No. 326, Augusta; 1925, No. 320, Cairo; 1927 No. 556, Sec. 1-3, College Park; 1923, No. 215, Sec. 8, 1925, No. 191, Columbus; 1923, No. 448, Secs. 3a-3f, Dublin; 1923, No. 535, East Lake; 1925, No. 284, Sec. 12, East Point; 1925, No. 298, Sec. 75, Macon; 1925, No. 97, Monroe; 1923, No. 332, Sec. 28, Valdosta; 1925, Nos. 145, 146, Waycross.
SAVANNAH, GA.—Ordinance, 1925
ILLINOIS.—Enabling Act, 1925, p. 244, Amending 1921, being Callaghan Stats. Ann. Ch. 24, secs. 521 ff.
KOKOMO, VALPARAISO, IND.—Ordinances, 1925
DES MOINES, RED OAK, IOWA.—Ordinances, 1925
SALINA, TOPEKA, KANS.—Ordinances, 1925
SHREVEPORT, LA.—Ordinance, 1925
LYNN, MEDFORD, NEWTON, NORTH ADAMS, SALEM, TAUNTON, WAKEFIELD, WESTFIELD, MASS.—Ordinances, 1925
EAST GRAND RAPIDS (1924), IRONWOOD, MIDLAND, OWOSSO, YPSILANTI (1925) MICH.—Ordidinances
DULUTH, MINN.—Ordinance, Oct. 29, 1925
FREMONT, NEBR.—Ordinance, 1925
AUBURN, BALDWINSVILLE, CUYUGA HEIGHTS, GLENS FALLS, LOWVILLE, PENN YAN, POTSDAM (1925), SANDS POINT (1922), N. Y.—Ordinances
LAKEWOOD, MARION, MAUMEE, OHIO.—Ordinances, 1925
MEDFORD, ORE.—Ordinance, 1923
BEAVER (1925), BEN AVON, CORNELLSVILLE (1924), EDGEWORTH, INGRAM, MONACA, MONESSEN, SWISSVILLE (1925), PA.—Ordinances
GREEN BAY, WEST ALLIS (1925), WAUSAU (1924), WIS.—Ordinances

An Outstanding Florida Decision

State ex rel. Shad v. Fowler, City Commissioner of Buildings, 105 Southern Reporter, 733.

A decision has just been rendered, unanimously, by the Supreme Court of the state of Florida en banc, which warrants the conclusion that reasonable municipal zoning ordinances passed in pursuance of a proper state enabling law, will be sustained by the Florida courts.

The facts in that case are as follows:

Mandamus to compel the city authorities of Jacksonville to issue a permit to erect a two-story building to be used for the retail of groceries and merchandise on the ground floor, and as flats or apartments for residence on the second floor, notwithstanding an ordinance of the city forbidding the erection of any buildings except for residence in the area in question.

On writ of error to the Circuit Court it was held that a permit for the building should be issued.

The official syllabus of the case, in full, is as follows:

"The Legislature may, pursuant to Section 8, Art. 8 of the constitution of Florida, authorize a municipality to regulate the uses of property by its owner when no other provision of organic law is thereby violated.

"A municipal power, clearly and duly conferred by statute, that reasonably restricts the uses of individual property for the general good, and that does not in effect unduly curtail the organic right to acquire, possess and protect property or invade property rights without due process or without affording equal protection of the laws, may be valid.

"The courts will enforce a due exercise of municipal or police power that is duly conferred and properly exerted, yet a municipality is a governmental agency with limited powers, and where a particular power is not expressly conferred or cannot be fairly regarded as included in or implied from powers expressly conferred, the particular power should not be exerted; and the courts will not enforce doubtful municipal powers.

"Municipal regulation curtailing the uses of real estate in defined areas of a city with reference to residence or business purposes, may be enforced where they are expressly authorized; and questions of reasonableness, not amounting to a violation of fundamental rights, will not prevent enforcement, when the particular power is definitely conferred, and it is justly and fairly exerted.

"Authority to materially curtail the uses of property under the general police power, when health, safety, morals, peace and comfort are not involved, will not ordinarily be inferred from general welfare powers conferred upon a municipality, particularly when kindred or similar powers are not expressly conferred, and have not been customarily exercised pursuant to general powers relating to the public welfare.

"No express authority having been given the municipality to pass an ordinance forbidding permits for the erection of a building 'to be used for any purpose other than that of a residence, except,' etc., the nature of the regulation contained in the ordinance does not warrant a judicial holding that power to pass the ordinance is included in or may fairly be inferred from the general welfare or other powers expressly conferred."

Other Recent Zoning Decisions

ILLINOIS.—*Troy v. Village of Forest Park*, 149 *N. E.* 281. An ordinance forbidding the location of a garage within 750 feet of the grounds of a church, irrespective of the character of the particular location of the garage, size of the church, grounds, or distance of the church from the garage, and without any provision for consent of authorities of the church sought to be protected, is unreasonable and arbitrary, and therefore void.

NEW YORK.—*Matter of Socora Realty and Construction Co., Inc. (Walsh et al.), Supreme Court*, reported in *New York Law Journal* February 3, 1926, p. 1796. Certiorari against the decision of the Board of Standards and Appeals of New York City, denying permission to erect in a business district and maintain a garage for the storage of more than five motor vehicles. The petitioner presented the consents of 100 per cent of the owners of the property in the area affected by the proposed prohibited use. The application was opposed by many civic organizations, and by property owners in the general neighborhood, although not within the specified area affected. The decision of the Board was sustained.

The consents of not less than 80 per cent of the property owners affected is merely a prerequisite to the right of applications to the Board of Standards and Appeals for permission to maintain a prohibited use, but is itself no authority to the board for the granting of such permission in the face of meritorious objections, regardless of their source. The Court analyzes the situation in the area in question and found that the Board of Standards and Appeals was right in deciding that the objections were meritorious.

NEW YORK.—*People ex rel. Fordham Manor Reformed Church v. Walsh et al., Supreme Court*, reported in *New York Law Journal*, February 2, 1926, p. 1779. Application for review by certiorari of proceedings of the Board of Standards and Appeals of New York City. The relator was opposed to the construction of a garage partly in a business, partly in a residential district. The Board ruled in favor of the garage for the reason that there was already a garage, which had formerly been a stable, immediately adjoining the premises in question. *Held*, on the evidence with regard to the character of the lot and the neighborhood, that the Board has abused its discretion in ruling in favor of the garage.

RHODE ISLAND.—*Richard v. Zoning Board of Review*, 130 *Atl.* 802. Certiorari to review an order of the Zoning Board of Review permitting the building of a three-family dwelling house on land adoining Richard's premises. There are provisions in the ordinance of the city of Woonsocket limiting by zones the number of families in dwellings, with relation to the number of square feet of the lots upon which they are to be erected. *Held*, that under the ordinance, the building in question could be erected on the lot in question.

Recent Zoning Literature

A report on the City Plan of Kenosha, Wis., contains an account of the operation of the zoning ordinance since its adoption, January 18, 1924; and an article on "The Legal Status of Zoning in Wisconsin."

The Department of Commerce, Washington, D. C., under date of January 1, 1926, has issued a supplement to its report of August 15, 1925, giving a list of zoning ordinances passed since that report.

The Department will also issue in the near future a reprint of its "Zoning Primer." As an appendix to this reprint, it is preparing a new and complete zoning progress report.

The readers of this magazine no doubt read with interest (in the February issue, pages 160-174) the account of the progress made under the Zoning Ordinance of Wichita, Kans., by P. L. Brockway.

The Municipal Bond Market

By Sanders Shanks, Jr.

Editor, *The Bond Buyer*

THE outstanding municipal financing effected during the month of February was New York City's $75,000,000 bond sale. This issue is the largest single offering that the city has ever made, and consequently the largest municipal bond offering in the history of the country. The bonds bear interest at the rate of 4¼ per cent and were sold at a price of 101.0589, which is equivalent to a net interest cost to the city of 4.185 per cent. Last May New York sold $60,000,000 4¼'s at a net rate of 4.045 per cent.

Aside from the New York City bonds, offerings of new issues were light, although there were several high-grade blocks of bonds placed on the market. The prices paid for these issues were in conformity with the steady improvement in the municipal market that has developed since the first of the year. For example, the state of Illinois sold $5,000,000 highway bonds at 4.06 per cent, and the state of Oregon $2,000,000 bonds at a net cost of 4.22 per cent. These rates indicate that the market is nearing the high point of last spring.

The subjoined list of the more important issues sold during the month of February is offered as a guide to cost of funds borrowed to finance improvements throughout the country:

Amount	Municipality	Maturity	Rate	Basis
$1,700,000	Buffalo, N. Y.....	1927-46	4¼	4.06
5,000,000	Illinois	1945-54	4	4.06
550,000	New Haven, Conn..	1931-56	4¼	4.08
75,000,000	New York, N. Y...	1927-76	4¼	4.185
655,000	Herkimer Co., N. Y.	1927-55	5	4.19
3,000,000	West Virginia.....	1935-88	4 & 4½	4.20
500,000	Beaver Co., Pa....	1928-52	4¼	4.22
2,000,000	Oregon	1928-33	4 & 4¼	4.223
928,000	Grand Rapids, Mich., Sch. Dist.....	1928-45	4½	4.27
954,000	Omaha, Nebr.....	1936-46	4¼ & 4½	4.27
990,000	Cincinnati, Ohio, Sch. Dist.....	1928-52	4½	4.28
531,000	Atlantic Co., N. J..	1927-41	4½	4.36
500,000	Okla. City, Okla...	1939-51	4½	4.41
750,000	Port of Portland, Ore.	1927-46	4¼	4.47
600,000	Sioux Falls, S. Dak.	1927-46	4½	4.48
1,675,000	Durham, N. C.....	1929-66	4¾	4.59
542,000	Houston, Tex., Ind. Sch. Dist.....	1927-30	5	4.61
1,050,000	High Point, N. C..	1929-66	4¾	4.72
1,750,000	Amarillo, Tex.....	1932-66	4½ & 5	4.93
500,000	Orange Co., Fla., Spec. Tax. Sch. Dist. No. 1.....	1929-56	5	5.23
700,000	Carteret Co., N. C.	1926-65	5½	5.43

Municipal and Civic Publications

Prices do not include postage unless so stated

Report of the North Jersey Transit Commission to the Senate and General Assembly of the State of New Jersey.—January 15, 1926. 120 quarto pp. Views, maps, plans. Apply to the Commission, 1 Newark Street, Hoboken, N. J.

This report embodies the engineering features of a comprehensive plan for passenger transit between communities within the nine northern counties comprising the district within the jurisdiction of the Commission and also between the communities within this district and the city of New York. Herbert S. Swan is the Secretary of the Commission; Daniel L. Turner, Consulting Engineer; and Charles N. Green, the Chief Engineer. The plan is transmitted with the recommendation that the work be continued by a commission with sufficient authority to develop a plan of interstate relationship, railroad cooperation and method of financing. The facilities here recommended will match up with those that will ultimately be required for Westchester and Long Island, distributing the traffic from all directions most conveniently to its destination in Manhattan without transfer.

The City Manager Plan in California.—By Randall M. Dorton, City Manager, Monterey, Calif. Reprinted from *City Manager Magazine*. A Master's thesis. 32 pp. The objects of this paper are: first, to show the reasons why California cities have adopted the city manager plan; second, to analyze the various city manager charters as to form and function; and, third, to show that the results accomplished under the city manager plan have justified its adoption. The paper is based upon interviews, experience, newspaper files, city charters and ordinances. 50 cents. (Apply to John G. Stutz, Executive Secretary, International City Managers' Association, Lawrence, Kans.)

The Personnel Problem in the Public Service.—Preliminary Report of the Conference Committee on the Merit System. 24 quarto pp. in *Public Personnel Studies* for January, 1926. The Committee consists of members designated by the National Municipal League, the Governmental Research Conference, the National Civil Service Reform League, the National Assembly of Civil Service Commissions, and the Bureau of Public Personnel Administration, respectively. It has been prepared to state what the public, operating officers, and employees have a right to expect from the public personnel agency, and to set forth the principles that should govern in determining the functions the personnel agency should exercise, the form it should take, and the legislation essential to give it the necessary authority. (Apply to Bureau of Public Personnel Administration, 26 Jackson Place, Washington, D. C.)

Appraisal Form for City Health Work.—Special Supplement to the January, 1926, issue of the *American Journal of Public Health*. Prepared by the Committee on Administrative Practice, of the American Public Health Association. Giving the Report of the Committee and the revised Appraisal Form (68 pp.). The first part of the report of the Committee is given as an abstract of the material presented by the Committee at the annual meeting of the Association last fall, and the remainder of it is incorporated in the introduction to the Appraisal Form. An interesting account is given of the progress of standardization in health practice, and the Form is accompanied by general directions for its use. The Appraisal Form is available as a separate pamphlet, at 50 cents. (Apply to the Association, 370 Fifth Avenue, New York.)

What Can Railway Men Do Toward Relief of Traffic Congestion?—By Walter Jackson, consultant. A paper presented before the October 29, 1925, meeting of the New England Street Railway Club, Boston, Mass. 8 pp. The answer to the question is "Cooperate, that is all." An enlivening presentation of the details involved in applying this answer to specific conditions. (Apply to the author, 143 Crary Avenue, Mt. Vernon, N. Y.)

The International City Manager's Association.—Publications; Purposes; Services. The City Manager Profession; Code of Ethics. January 1, 1926. Handy size. 16 pp. 25 cents. (Apply to John G. Stutz, Executive Secretary, International City Managers' Association, Lawrence, Kans.)

Traffic Control and the Traffic Problem.—By C. A. B. Halvorson, Jr., Designing Engineer, Street Lighting Engineering Department, General Electric Company; and J. G. Regan, of the same department. A paper presented before the annual convention of the Illuminating Engineering Society, at Detroit, Mich. 32 pp. in the Transactions of the Illuminating Engineering Society, November, 1925. Illustrated. The necessity of warning-beacons with illuminated directional signs for traffic guiding is shown, and of properly designed signals and control apparatus for traffic regulation. The "selective system" as used in Boston is described, and also new types of signals and automatic control mechanisms. The need of a more complete standardization of the features of traffic control is emphasized. (Apply to the Society, 29 West 39th Street, New York.)

International Association of Dairy and Milk Inspectors.—Fourteenth Annual Report of the Association, including papers read at the annual convention in Indianapolis, Ind., October 12, 13 and 14, 1925. Compiled by Ivan C. Weld, Secretary-Treasurer, Pennsylvania Avenue at 26th Street, Washington, D. C. 286 pp. Containing a number of important committee reports, among them the one on sanitary control of ice cream, by Ralph E. Irwin, Chairman; also "The Health Department and the Milk Dealer," by Wm. B. Palmer, Executive Officer, Milk Inspection Association of the Oranges, Orange, N. J. (Apply to the Secretary-Treasurer.)

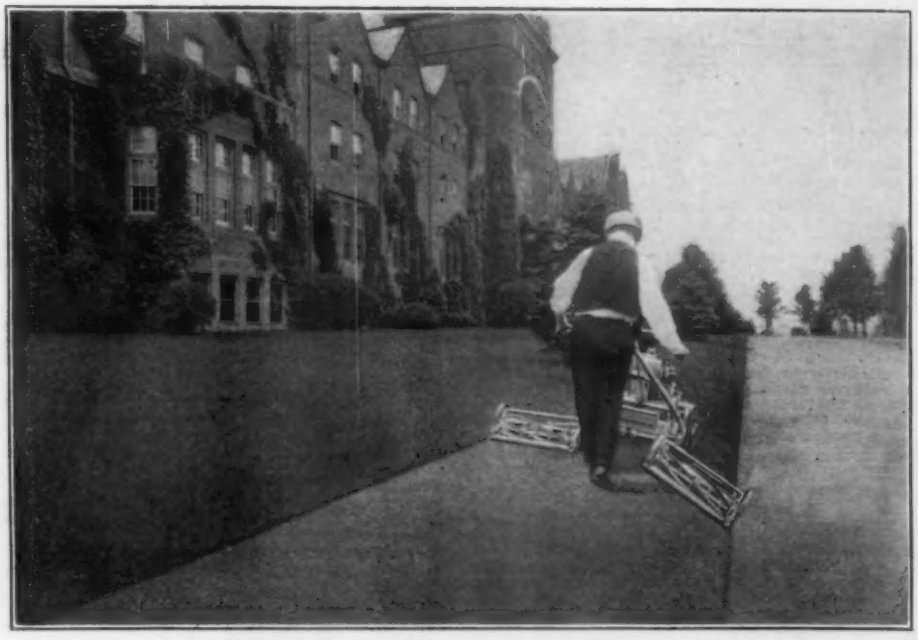
The Regulation of Outdoor Advertising by Law.—By Frank B. Williams, A. M., LL. B., of the New York Bar. Bulletin of The Municipal Art Society of New York, February, 1926. 8 pp. Mr. Williams believes that the awakening of public opinion is the first thing to work for, and that when this has been accomplished, legislation should be secured to crystallize and enforce the public will. This pamphlet is a practical aid to this end. It includes a page of statutes in different states regulating outdoor advertising. (Apply to the Society, 119 East 19th Street, New York.)

Eleventh Annual Conference on Highway Engineering.—Proceedings of the Conference held at the University of Michigan, February 16-19, 1925, under the direction of the College of Engineering, with the cooperation of the Michigan State Highway Department and the Michigan Association of Road Commissioners and Engineers. 478 pp. Photographs, diagrams, tables. The December 12, 1925, issue of *University Bulletin*. (Apply to the University, Ann Harbor, Mich.)

The Cost of American Almshouses.—By Estelle M. Stewart. Bulletin No. 386 of the U. S. Bureau of Labor Statistics. June, 1925. V + 54 + VII pp. A study of poor farms and almshouses in each of the 48 states. The Department of Labor has determined the financial aspect, and private agencies cooperating with it, and to a certain extent under its direction, have studied the social and humanitarian side of institutional pauper relief. This pamphlet is the report of the Department. The reports of the fraternal societies on their studies of the subject will be published by those societies. 10 cents. (Apply to the Government Printing Office, Washington, D. C.)

Future Parks, Playgrounds and Parkways in Boston.—Report of Arthur A. Shurtleff, landscape architect. Submitted by the Boston Park Department, November, 1925. 61 quarto pp. Views, maps, plans, tables. An elaborate and valuable report presenting a study made during the past two years to determine the probable future needs of the city for parks, parkways, and playgrounds, and showing the distribution, size, and character of these public open spaces. (Apply to the Department.)

What About Motion Pictures?—Do They Endanger Health? Encourage Crime? Injure Weak Minds? Are They Worthless in Education? etc.—"The Facts—Stated By Those Who Know." These and similar questions are answered in the negative by quotations from heads of penal institutions, hospitals, schools, clubs, and other institutions and organizations. A list is given, by states, of institutions that show movies to their wards. 12 pp. (Apply to Motion Picture Producers and Distributors of America, Inc., 469 Fifth Avenue, New York.)



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The Model "L" Cuts a 60-inch Swath

THE extreme cutting width (60 inches) and the flexibility of the Model "L" Motor Lawn Mower and Roller are the two important features that make it the most desirable machine for use on parks, school and other public grounds.

Without the gang units attached, the Model "L" mows and rolls simultaneously a 25 inch swath. With the gang units, which increase the cutting swath to the extreme width of 60 inches, one man with a Model "L" can cover 10 acres of mowing a day.

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DEPENDABLE LAWN *MOWERS*

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COLDWELL LAWN MOWER COMPANY, NEWBURGH, N. Y., U. S. A.

Economic Value of Reinforcement in Concrete Roads.—Summary of Conclusions of Report of Investigations by Highway Research Board, Division of Engineering and Industrial Research, National Research Council, Washington, D. C. 1926. 8 pp. Illustrated. The investigation covered conditions on about 3,000 miles of concrete roads, both plain and reinforced, located in 26 states. The complete report will be available about March, 1926. (Apply to the Board.)

Greater Cleveland.—Volume I, Number 1 of a new bulletin on public business, published by The Citizens League of Cleveland, Ohio. 4 pp. To be published weekly from September 15 to June 15 and mailed to the more than 5,000 members of the Citizens League and to public officials in the various departments of the county, city, school, and suburban governments. $1 per year. This first number discusses the cuts in the 1926 budget, the matter of insuring city buildings, and, in the department called "The Listening Post," the most recent meetings of the City Council, the School Board, and the County Commissioners. (Apply to the League.)

The American Stage.—Reflections of an Amateur. An address by Otto H. Kahn at the Conference on the Drama in American Universities and Little Theatres, at the Carnegie Institute of Technology, Pittsburgh, Pa., on November 27, 1925. Pocket size. 24 pp. Mr. Kahn believes that it should be possible to give American dramatic talent a chance to demonstrate itself adequately, by enlisting local pride, giving opportunity to local talent, and developing sentiments, aspirations, and interests latent among the people throughout the country, to maintain local or community theatres of good taste and broad significance; and that the need for leadership can be supplied from the natural recruiting ground of the colleges and universities. (Apply to author, 52 Williams Street, New York.)

An Analysis of the Detroit Special Assessment Sinking Fund.—A report prepared for the City Controller and the City Treasurer by the Detroit Bureau of Governmental Research, Inc. October, 1925. 33 mimeographed pp. 50 cents. Showing the city's procedure on financing improvements paid for by special assessment, together with a statement of the condition of the Special Assessment Sinking Fund as at December 31, 1924. (Apply to the Bureau.)

"Universal" Installation of Water Meters. Changes in Water Rates; etc.—Ordinance passed by the City Council of the city of Chicago, September 1, 1925. 16 pp. (Apply to Municipal Reference Library.)

Partially Standardized Tests for Junior Clerk.—In the December, 1926, issue of *Public Personnel Studies*. 27 quarto pp. It is stated that in the opinion of a considerable number of persons familiar with modern employment practices the tests described in this article seem to be free from some of the objections brought against other tests sometimes used for selecting junior clerks. 35 cents. (Apply to the Bureau of Public Personnel Administration, 26 Jackson Place, Washington, D. C.)

Municipal Auditoriums in 46 Cities.—A digest of information on this subject collected by the City Auditorium Committee of the Spokane Chamber of Commerce, Spokane, Wash. 21 mimeographed pp. (Apply to the Committee.)

National Community Center Association.—Members' Bulletin, No. 1, February, 1926. 9 mimeographed pp. This Bulletin will be supplemental to the Community and Neighborhood Department conducted by the Association in *Social Forces*. It plans to present: case studies of organization procedure of a community nature, analyses of organization projects, descriptions of communities, rules or plans of community center activities; questions put by members, and the resulting discussion; news notes in the field of community organization. Included in the interesting material in this first number is a statement of the official policy of the New York City Board of Education in reference to forums in public schools. (Apply to LeRoy E. Bowman, Secretary and Editor, 503 Kent Hall, Columbia University, New York.)

National Committee for Restriction of Outdoor Advertising.—Two pamphlets—"Progress in 1925", 8 pp.; showing what the various states have done to protect the beauty of landscapes from bill-boards, what the present attitude of the sign-board companies is, and stating the program for 1926. "What Attracts the Tourist to Your Town?"; 8 pp., illustrated; answering this question in a very pointed way, that makes our bill-board blots on the landscape look bigger and blacker. (Apply to the Committee, 119 E. 19th St., New York.)

City-Planning Procedure.—Four papers with Introduction by Frederic A. Delano: Securing Results in City Planning, by Harland Bartholomew; Technical Advice in City Planning, by George B. Ford. Financing Improvements by Special Assessments, by Lawson Purdy; and Paying for City Planning Projects, by Harlean James. 32 pp. 25 cents. (Apply to American Civic Association, Union Trust Bldg., Washington, D. C.)

Design and Equipment Features of Connecticut Swimming Pools.—By Warren J. Scott, Director, Bureau of Sanitary Engineering, Connecticut State Department of Health. In the January, 1926, issue of the *Connecticut Health Bulletin*. 7 pp. Illustrated. This is a discussion of conditions disclosed by a recent survey of swimming pools by the State Department of Health, leaving the operating features to be discussed in another article. (Apply to the State Department of Health, 8 Washington Street, Hartford, Conn.)

Rapid Transit, Los Angeles, Calif.—Supplement to the *Bulletin* of the City Club of Los Angeles, for January 30, 1926. A study by seven members of the Club, of the Kelker-DeLeuw report on rapid transit. 19 pp. The committee agrees with certain features of the Kelker plan and with many statements and observations in it, but does not accept the program as laid down either in its order of development or in its extent. (Apply to the City Club, Los Angeles, Calif.)

Safeguarding the City's Milk Supply.—By Dr. H. C. Becker, Veterinarian and Director of Tuberculosis Eradication, Department of Health, Chicago. 5 pp. in the January, 1926, *Bulletin* of the Chicago Municipal Tuberculosis Sanitarium. Illustrated. Showing how the production and marketing of milk for Chicago is supervised and regulated. (Apply to the Sanitarium, 5601 North Crawford Avenue, Chicago, Ill.)

The Toledo Police Department.—How Your Police Department Functions. Report on the Operation of the Toledo [Ohio] Police Department and on Local Crime Conditions, by the Commission of Publicity and Efficiency. Supplement to *The Toledo City Journal*, January 30, 1926. 32 quarto pp. The closest analysis of this department that has ever been prepared in this city. (Apply to the Commission.)

Rapid Transit.—*Bulletin* of the General Contractors' Association, 51 Chambers Street, New York, for December, 1925. A number of articles on subways in the modern city, giving engineering details and financial plans in rapid transit progress in Philadelphia, Boston, Pittsburgh, and Detroit, with a leading article by John H. Delaney describing New York City's New Subway System. (Apply to the Association.)

Requisites for a Sound System of Assessment for Taxation.—Published by the Technical Advisory Corporation, 15 Park Row, New York. 1926. 16 pp. Setting forth the method of assessment revision practiced by the Corporation and its advantages in fairness and efficiency. (Apply to the publishers.)

Detroit School Health Service.—By Don W. Gudakunst, M.D., Director of School Medical Inspection, Detroit, Mich. In *City Health*, the monthly bulletin of the Detroit Department of Health, August-September, 1925. Showing the details of this work in the Detroit schools, which is accomplished by the closest cooperation between the Board of Education and the Health Department. (Apply to the Department of Health.)

Progress Report on Proposed Intermediate Thoroughfare, Boston.—Issued by the City Planning Board with the cooperation of the Advisory Committee on Public Improvements, December, 1925. 38 pp. Illustrated. (Apply to the Board.)

Municipal Reports Received

BERKELEY, CALIF.—Annual Report, City Manager, 1924-1925

CHICAGO, ILL.—Classification of Accounts and Commodity Code. From Office of City Comptroller, Division of Statistics. 1926

CHICAGO, ILL.—Rules and Regulations of the Municipal Playgrounds issued by the Bureau of Parks, Playgrounds, and Bathing-Beaches

COOK COUNTY, ILL.—Annual Message of the President of the Board of Commissioners, 1925

DEPOSIT, N. Y.—Code of Ordinances, 1925

DETROIT, MICH.—Report of the Mayor's Committee on Traffic, 1925

HARTFORD, CONN.—Annual Report, Department of Engineering, year ending March 31, 1925

JAMESTOWN, N. Y.—Annual Message, Mayor, January 1, 1926

MUSKOGEE, OKLA.—Annual Report of City, year ending June 30, 1925

PASADENA, CALIF.—Annual Report, Water Department, 1924-1925

RICHMOND, VA.—Report by Director of Public Works on Ten-Year Construction Program, October 29, 1925

SAINT PAUL, MINN.—Budget Appropriations, for the year 1926

WILMINGTON, DEL.—Annual Report, Board of Water Commissioners, 1924-1925

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CHEVROLET

Easy to Load

THIS sturdy One-Ton Chevrolet Truck is easy to load or unload because its floor is level with or lower than practically all loading platforms.

Also, its turning radius is extremely short, enabling the truck to swing quickly into position.

Time saved in loading—speed between stops—the big, powerful, economical Chevrolet valve-in-head motor—the extra strong rear axle—and the most rugged truck - type construction throughout — these are some of the many advantages that Chevrolet engineers have built into the Chevrolet One-Ton Truck—this is why your most economical investment in a one-ton truck is to be found in a Chevrolet.

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1-Ton Truck Chassis $550 f. o. b. Flint, Mich.

Also Half Ton Truck Chassis $395 f. o. b. Flint, Mich.

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QUALITY AT LOW COST

On the Calendar of Conventions

MARCH 3-5.—ST. CATHERINES, CANADA
Canadian Section of the American Water Works Association. Annual meeting. Secretary, A. U. Sanderson, Island Filtration Plant, Toronto, Ont.

MARCH 3-5.—REGINA, SASK.
Saskatchewan Association of Rural Municipalties. Annual convention. Secretary, W. E. Hodge, 227 Main Street, Moose Jaw, Sask.

MARCH 11-13.—ALBANY, N. Y.
New York State Safety Congress. Under the auspices of Bureau of Motor Vehicles, State Tax Department. Address: James B. Wallace, Secretary of the Congress, 6 William Street, Albany, N. Y.

MARCH 23-25.—WASHINGTON, D. C.
National Conference on Street and Highway Safety. Secretary, Ernest Greenwood, Department of Commerce, Washington, D. C.

MARCH 29-31.—ST. PETERSBURG, FLA. APRIL 1.—WEST PALM BEACH, FLA.
National Conference on City Planning. Annual conference. Secretary, Flavel Shurtleff, 130 East 22nd Street, New York.

APRIL 12.—NEW YORK, N. Y.
National Committee on Prisons and Prison Labor. Annual meeting. Secretary, Miss Julia K. Jaffray, 4 West 57th Street, New York.

APRIL 14-16.—KANSAS CITY, MO.
American Society of Civil Engineers. Spring meeting. Secretary, George T. Seabury, 33 West 39th Street, New York.

MAY 3-8.—ATLANTA, GA.
National Congress of Parents and Teachers. Annual convention. Executive Secretary, Mrs. Arthur C. Watkins, 1201 16th Street N. W., Washington, D. C.

MAY 5-7.—WASHINGTON, D. C.
American Institute of Architects. Annual meeting. Executive Secretary, E. C. Kemper, The Octagon, Washington, D. C.

MAY 10-13.—ATLANTIC CITY, N. J.
National Fire Protection Association. Annual meeting. Secretary, Franklin H. Wentworth, 40 Central Street, Boston, Mass.

MAY 11-13.—WASHINGTON, D. C.
Chamber of Commerce of the United States of America. Fourteenth annual meeting. Secretary, D. A. Skinner, 1615 H Street N. W., Washington, D. C.

MAY 12-14.—WASHINGTON, D. C.
American Federation of Arts. Annual meeting. Secretary, Miss Lelia Mechlin, 1741 New York Avenue, Washington, D. C.

MAY 13-15.—WASHINGTON, D. C.
Southern Commercial Secretaries Association. Annual meeting. Secretary, B. S. Barker, Atlanta, Ga.

MAY 14-15.—PHILADELPHIA, PA.
American Academy of Political and Social Science. Annual meeting . Secretary, J. P. Lichtenberger, P. O. Box 4060, West Philadelphia, Pa.

WEEK OF MAY 17.—ATLANTIC CITY, N. J.
American Health Congress. Address: Sally Durham Hanshue, Secretary, Committee on General Arrangements, National Health Council, 370 Seventh Avenue, New York.

MAY 17-20.—NEW YORK, N. Y.
American Association of Museums. Annual convention. Executive Secretary, Laurence Vail Coleman, 2 West 46th Street, New York.

MAY 25-26.—CORPUS CHRISTI, TEX.
League of Texas Municipalties. Annual convention. Executive Secretary, Harvey W. Draper, 815-½ Capitol Avenue, Houston, Tex.

MAY 26-JUNE 2.—CLEVELAND, OHIO
American Association for Community Organization. Annual meeting. Director, Dr. Allen T. Burns, 215 Fourth Avenue, New York.

JUNE 5-7.—BUFFALO, N. Y.
Conference of State Sanitary Engineers. Annual meeting. Secretary-Treasurer, Arthur P. Miller, Assistant Sanitary Engineer, U. S. Public Health Service, Washington, D. C.

JUNE 7-11.—BUFFALO, N. Y.
American Water Works Association. Annual meeting. Secretary, Beekman C. Little, 43 City Hall, Rochester, N. Y.

JUNE 14-16.—HOT SPRINGS, ARK.
National Conference on State Parks. Annual meeting. Secretary, Miss Beatrice M. Ward, 904 Union Trust Building, Washington, D. C.

JUNE 22-24.—MANCHESTER, N. H.
New England Association of Fire Chiefs. Annual convention. Secretary, Chief John W. O'Hearn, Watertown, Mass.

AUGUST 16-28.—EVANSTON, ILL.
National School for Commercial and Trade Executives. Address: John N. Van der Vries, Chamber of Commerce of the United States, 801 Otis Building, Chicago, Ill.

SEPTEMBER.—VIENNA, AUSTRIA
International Conference on Housing and Town Planning. Address: H. Chapman, Organizing Secretary, International Federation for Town and Country Planning and Garden Cities, 3 Gray's Inn Place, London, W. C. 1, England.

OCTOBER 19-22.—NEW ORLEANS, LA.
International Association of Fire Engineers. Annual convention. Secretary, James J. Mulcahey, City Hall, Yonkers, N. Y.

OCTOBER 24-27.—PITTSBURGH, PA.
National Association of Commercial Organization Secretaries. Annual meeting. Secretary, Walter O. Lochner, Chamber of Commerce, Trenton, N. J.

NOVEMBER 8-12.—WASHINGTON, D. C.
American Society for Municival Improvements. Annual convention. Secretary, C. W. Sammelman, 3817 Olive Street, St. Louis, Mo.

Five Ways of Regulating Bill-Boards by Law

IN Bulletin No. 25 of the Municipal Art Society of New York*, published February, 1926, Frank B. Williams, Esq., suggests that interested citizens in the various states may aid in the movement for the regulation of outdoor advertising by law in the following ways:

First, by securing the passage of laws for the stability of bill-boards, their construction so as not to make fire fighting more difficult, so as not to conceal filth, etc. In so doing they should, incidentally, have regard to the appearance of the bill-board.

Second, by forbidding advertising on public property, making it a crime, giving any person the right to remove it, and making it a presumption that the person advertised authorized the placing of the advertisement on the property.

Third, by making it a crime to place advertisements on private property without the written consent of the owner, and making it a presumption that the person advertised authorized the placing of the advertisement on the property in question.

Fourth, by passing state laws authorizing zoning by all the local governments within the state, and seeing to it that proper zoning regulations under which general advertising is confined to business and industrial localities are enacted by all these governments.

Fifth, by seeking to find occasions (as was done in New York) in which objectionable advertising can be regulated or forbidden on private property, passing statutes for that purpose, and seeing to it that these statutes are vigorously supported in the courts; or by passing a constitutional amendment more or less like that in Massachusetts for the regulation of outdoor advertising generally.

* See department of Municipal and Civic Publications in this issue.

Where the work is heavy and the space is cramped they use Autocars

These Contractors' 3-ton Autocar Dump Trucks (Model HPDS belong to George Bobek of Stockton, Cal. They are shown working on a job building a 12-mile branch line of the Southern Pacific Railroad. Autocars moved 160,000 yards of rock on this job.

"STURDY AUTOCAR DUMP TRUCKS AND THOSE WHO USE THEM"

THE material you have to haul may not be measured by the thousands of cubic yards—yet the same strudy Autocar construction that has made Autocar trucks the standard for road building will save you money.

Your trucking routes may not be through narrow cuts and deep, crowded excavations — however when your trucks are running in crowded traffic or delivering in narrow streets and alleys you too will find that Autocar short wheel-base saves minutes and dollars.

Whatever your business, one of these books will be of real value to you. We will gladly send you any of them on request:

"AUTOCAR TRUCKS FOR BUILDING ROADS"

"STURDY AUTOCAR TRUCKS FOR HAULING MERCHANDISE"

"STURDY AUTOCAR TRUCKS IN PUBLIC SERVICE"

The Autocar Company, Ardmore, Pa.
ESTABLISHED 1897

Branches in 51 Cities

Autocar
gas *and* electric trucks
EITHER OR BOTH - AS YOUR WORK REQUIRES

News and Illustrations

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

A Permanent Traffic Marking for Pavements

Marking pavements to indicate dangerous curves, railroad crossings, schools, boulevard stops, and crossings is now standard practice. Our modern traffic could not possibly be controlled without these and an endless number of other directions marked on the roads as a substitute for policemen where traffic is light and to simplify control on busy intersections.

To obviate the necessity of constant repainting, the Bridgeport Brass Company, Bridgeport, Conn., has developed brass traffic spots, the cost of which is easily paid for by five or six paint jobs. These traffic spots, which are brass cups made 3 inches in diameter for pedestrian lanes and markings and 4½ inches in diameter for traffic divisional lines, are inserted in asphalt pavements simply by pounding with a flat face cast iron road tamper or by laying them down on the spots where marked and running a steam roller over them.

BRASS TRAFFIC SPOTS ON SUBURBAN HIGHWAY TO KEEP TRAFFIC FROM CUTTING NEAR CORNER

Designs for the layout of these traffic spots are easily made with a rule, a piece of string, and a piece of chalk. The best results are obtained by inserting one 3-inch spot in every foot, that is, leaving 9 inches between the outer edges of the spots. The larger or 4½-inch spots can be placed one spot in every 16½ inches, that is, leaving 12 inches between the inner edges of the spots.

Anchor Moves New York Sales Office

The Anchor Post Iron Works has announced the removal of its New York sales office to 9 East 38th Street, New York.

Clemmer Joins Solvay Staff

The Solvay Process Company, Syracuse, N. Y., has announced the resignation of H. F. Clemmer, Chief of the Bureau of Materials of the Illinois Highway Division, and his appointment as Technical Advisor to the Calcium Chloride Sales Department of the Solvay Company. For many years he has been identified with investigations and testing of structural materials.

Mr. Clemmer is Chairman of the Non-Bituminous Section of the Committee on Tests and Investigations of the American Association of State Highway Officials and of the Subcommittee on Asphalt Content of the same organization. He is Chairman of the Subcommittee on Specifications and Tests of Fine and Coarse Aggregates of Committee C-9, and a member of the Committee on Admixtures, both of the American Society of Testing Materials. In addition, he holds membership in several other committees of this organization. Mr. Clemmer is also a member of the American Society of Civil Engineers, the American Society for Municipal Improvements, and the American Concrete Institute. He is very well known for his investigations, which have demonstrated the value of calcium chloride as a curing agent and accelerator of the setting of concrete.

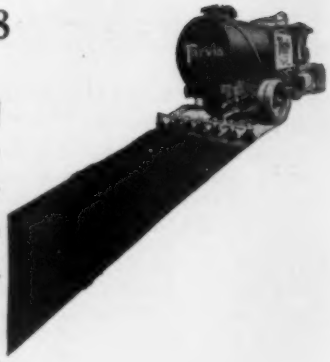
Brick Manufacturers Hold Twentieth Annual Meeting

The National Paving Brick Manufacturers Association celebrated its 20th anniversary at its annual meeting the latter part of January, with more than 100 manufacturers, salesmen, field engineers, and superintendents present. The principal speakers were Thomas H. MacDonald, Chief, U. S. Bureau of Public Roads; E. F. Kelly, Chief, Division of Tests, U. S. Bureau of Public Roads; E. J. Mehren, Vice-President, McGraw-Hill Company; and Dr. G. C. Mars, Director of Service, American Face Brick Association

The second day of the convention was devoted to group meetings of executives, field engineers, salesmen, superintendents, and operating managers. The development of paving brick of less than 3 inches in thickness was discussed at all these group meetings. It was pointed out that brick 2½ inches in thickness were now being used on streets and highways for light and medium traffic and that pavements of this design as much as 12 years old are still in excellent condition.

Revise your specifications—

12 gallons now does the work of 18



"TARVIA-KP" has been greatly improved — its binding strength has been vastly increased. Twelve gallons of the new "Tarvia-KP" are all that are required to each cubic yard of aggregate to make a perfect patching mixture.

This new mixing proportion has been carefully checked many times during the past season. Highway officials enthusiastically recommend it. For it means big savings in cost of materials and gives a better job.

A trial with the twelve-to-one proportion and a comparison of results will convince the most skeptical.

Note: "Tarvia-KP" is the recognized First Aid Kit in highway emergencies—good for every type of pavement. Unvarying in quality and unfailing in service, "Tarvia-KP" demands and holds first place in its field.

The Barrett Company

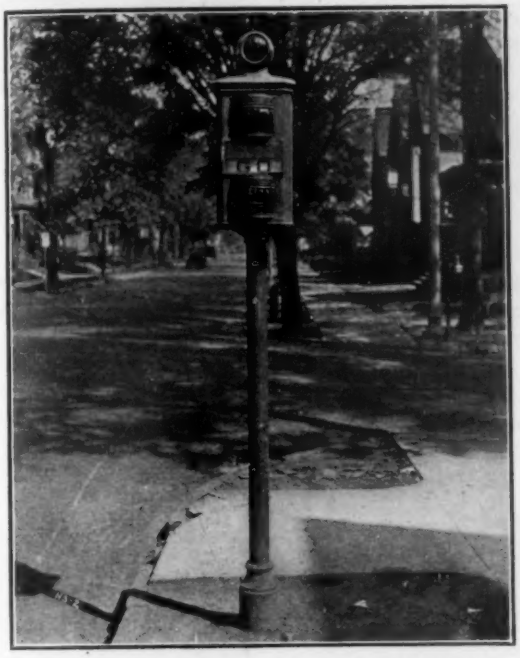
New York	Chicago	Philadelphia	Boston
St. Louis	Cleveland	Cincinnati	Pittsburgh
Detroit	Kansas City	Birmingham	Dallas
Minneapolis	Salt Lake City	Bethlehem	Lebanon
Youngstown	Milwaukee	Toledo	Columbus
Baltimore	Syracuse	New Orleans	Rochester
Providence			Buffalo

In Canada:
THE BARRETT COMPANY, Limited
Montreal Toronto Winnipeg Vancouver

Tarvia-KP
FOR COLD PATCHING

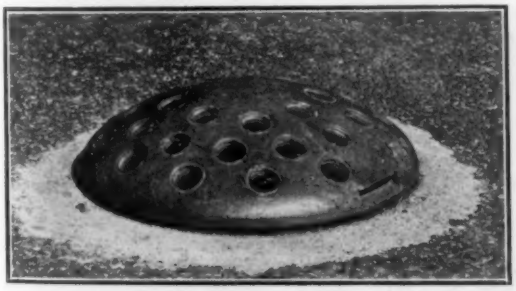
Automatic Traffic Regulators

The Highway Signal Company, Edgerton, Wis., has placed on the market a new form of highway traffic signal, in which the command "Stop" or "Go" is given in both the color and word in two separate stations with one operation. An improvement in visibility is effected without the use of sun visors, through the development of a special lense which shows a brilliant color whenever the light is on, no matter how bright the sun may be.



FRONT VIEW OF HIGHWAY TRAFFIC SIGNAL

It is claimed by the manufacturer that there is great economy of operation in this control equipment through the use of smaller electrical units. Actual costs on installations already made, figuring electricity at 7 cents per kilowatt-hour, are only $10 to $12 per year for an intersection of four units.



DOME-SHAPED HIGHWAY TRAFFIC CONTROL UNIT

This same company also makes traffic buttons which are proving very effective. The curvature and height of this traffic button will allow the wheel of an automobile to collide with it without damage to either the car or the button. It can also be placed between street-car tracks without coming in contact with the automatic car-stops now used in many cities. The top is removable without the use of tools or bolts, as it is simply lifted off. Temperature changes have no effect on the glass, which is furnished in green, red, or amber color.

New Vibrolithic Appointments

The American Vibrolithic Corporation, Des Moines, Iowa, has announced the appointment of Parker S. Bookwalter as its Ohio state manager. He will have active charge of the sale and extension of Vibrolithic and Interlocking bituminous pavements in the state of Ohio. Mr. Bookwalter was for two years Deputy County Engineer of Montgomery County, Ohio, two years Assistant City Engineer, Dayton, Ohio, five as Chief Engineer in charge of municipal and sanitary engineering work for K B. Allen, and four years as County Engineer of Montgomery County, Ohio. Later he was Ohio representative of the Rock Asphalt Company, and for the past two years he has been Chief Engineer of the Ohio Valley Rock Asphalt Company. His office will be 812 Harries Building, Dayton, Ohio.

Michigan Vibrolithic, Inc., 111 Kresge Building, Detroit, Mich., has announced the addition of C. D. Smith and J. B. Donaghey to its sales organization.

Pittsburgh Meter Company Takes Larger Chicago Quarters

The Pittsburgh Meter Company, 7800 Susquehanna Street, Pittsburgh, Pa., has announced that in order to take care of its increased business it has been obliged to secure more commodious quarters in Chicago for its office, stockroom, and service department.

Accordingly, it has moved from 5 South Wabash Avenue to its new location in the Michigan-Ohio Building, located at 612 North Michigan Avenue, Chicago.

Consultants for Roxboro, N. C.

Spoon & Lewis, consulting engineers, Greensboro, N. C., associated with Fay, Spofford & Thorndike, consulting engineers, Boston, Mass., have been retained by the town of Roxboro, N. C., as engineers in connection with the proposed extensions to water and sewerage systems, street paving and sidewalk construction. The extent of the improvements to be undertaken has not as yet been decided. The extensions to the water and sewerage systems will not involve any structures.

New Westinghouse Interior Lighting Engineers

The Westinghouse Electric & Manufacturing Company, George Cutter Works, South Bend, Ind., has recently announced the appointment of W. F. Spaulding as Interior Lighting Engineer at the Cincinnati office. He was formerly with the Inter-Southern Life Insurance Company at Louisville, Ky. The appointment of R. A. Skinner, assigned to the Milwaukee office, has also been announced. Mr. Skinner was formerly with the L. B. Michaels Company of Pittsburgh, Pa., where he was engaged in public utility sales promotion work.

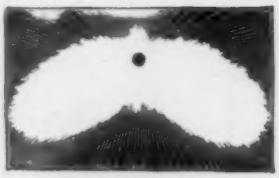
HOLOPHANE

Asymmetric Street Lighting

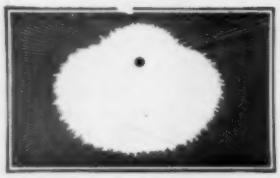
4-WAY REFRACTOR—For use over the center of street intersection.

2-WAY REFRACTOR—For use between intersections when blocks are long.

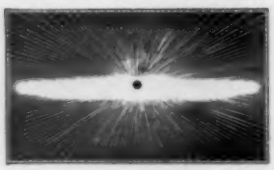
BILUX REFRACTOR—For use in ornamental units.



ASYMMETRIC DOME—For use in ornamental units.



HIGHWAY REFRACTOR—For lighting highways.



THE HOLOPHANE COMPANY
NEW YORK AND TORONTO

HOLOPHANE DIRECTS LIGHT SCIENTIFICALLY

HADFIELD-PENFIELD ONE-MAN GRADER OPERATING AS SNOW-PLOW

One-Man Grader Cleans Up Snow

An interesting report from Ravenna, Ohio, tells how one of the severe January snow-storms was quickly removed from city streets by an H-P one-man grader made by the Hadfield-Penfield Steel Company, Bucyrus, Ohio. The total snowfall was about 8 inches, and snow-plows which were started Friday at midnight opened up the walks and streets so that it was possible to reach all places of business and employment Saturday morning.

This grader, which was adjusted to perform the functions of a snow-plow, has Rigid Rail wheels at the rear and pushes its way through drifts and big banks of snow very easily. Service Director Dussell and John Sorenson, Street Superintendent, witnessed the demonstration of the work of this machine on Diamond Street, which was cleared for its full width from end to end in less than one hour.

Pittsburgh-Des Moines Branch Offices

The Pittsburgh-Des Moines Steel Company, 903 Curry Building, Pittsburgh, Pa., has announced the following list of branch offices through which water-works officials may secure complete information regarding its elevated steel tanks and towers, structural steel work, complete municipal water-works installations and incinerators: 905 Tuttle Street, Des Moines, Iowa; 607 Hudson Terminal Building, New York; 309 Bass Arcade Building, Orlando, Fla.; 1213 First National Bank Building, Chicago, Ill.; 1215 Praetorian Building, Dallas, Tex.; 317 Rialto Building, San Francisco, Calif.; 319 Pioneer Building, Seattle, Wash., and 321 Glenn Building, Atlanta, Ga.

A New Unit Flasher for Traffic Signals

A distinct innovation in traffic control flashing devices has been developed by the Reynolds Electric Company, 2663 West Congress Street, Chicago, Ill., in its new Unit Flasher. This device is a motor-driven flashing mechanism which is positive in timing, rugged in construction, small in size, neat in appearance, quiet in operation, weather - proof, and easily installed, and has shown its value in installations.

It is made specially for electric sign service with one brush to flash on and off, two brushes to flash one side and then the other, or two colors alternately, and three brushes for three-color combinations. Its breadth of service includes warning signals, blinking lights, railroad crossings, traffic guides, and flashing beacons. It will handle from 400 to 800 watts per circuit. The flasher mechanism is driven through a train of gears by a standard power motor, and all is built in a special motor frame of cast iron and is therefore self-contained.

THE NEW, COMPACT RECO FLASHER

Street Sign Company Changes Address

The Municipal Street Sign Company, Inc., has announced its removal to 287 Broadway, New York City, where it will be pleased to meet its old customers. The telephone is Worth 3204.

With All Risk Eliminated

THERE are fixed guide posts to be heeded by every city contemplating an investment in better street lighting. By watching them, the safety of the investment and the surety of big returns over a long span of years are certain.

Proper selection of the *kind* as well as design of standard is vital.

When architectural fitness is observed,—when choice of design is under consideration, then also *permanence* of the installation should be carefully weighed. Good looks and long life are indispensable factors.

The right organization should be called in for the skilled experience—guided advice and consultation which are sure preventatives of future dissatisfaction.

As the pioneer municipal lighting standard organization of the country, we have seen some amazingly happy results achieved by intelligent planning. And in these we have played—in all due modesty—a prominent part.

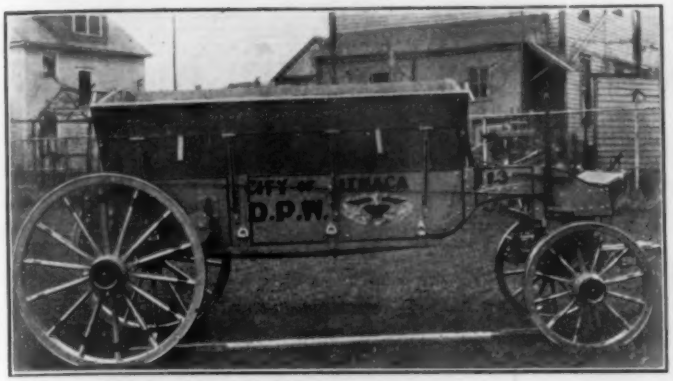
It is, therefore, a matter of real pride to us when city officials, civic organizations, and private citizens write us that King cooperation enabled their cities to avoid the pitfalls of hasty error.

If you are interested in this important subject of better street lighting, send for a copy of the King Design Book No. 100—we will furnish it most gladly and promptly.

KING COMPANY.

General Office: 230 South Clark Street, Chicago

The World's Largest Exclusive Makers of Lighting Standards



HORSE-DRAWN GARBAGE COLLECTION WAGON FOR ITHACA, N. Y.

The Horse Still a Factor in Garbage Collection

Notwithstanding the inroads the motor truck has made in some branches of business, the horse still finds his place to a large degree not only in country work, but in work of considerable importance in our cities. For instance, there are many cities throughout the United States still using the horse-drawn ash and garbage wagon because there are so many stops and so many peculiar places to visit where the horse is found to be the most practical and economical for this work.

The accompanying illustration shows an Eagle 5-yard garbage wagon made by the Eagle Wagon Works, Auburn, N. Y. This is a duplicate of the wagons recently delivered by this company to Easton, Pa., Ithaca, N. Y., and Rochester, N. Y. As the rear axle of these wagons is arched high to clear the load, and as the side doors swing out and up during the dumping, the wagon is easily moved after dumping its load. Further, while the wagon is large and may look cumbersome to some, yet owing to the rocking member in the king-bolt the wagon fits itself very easily to the rough surface of the city dump.

Paper Ballots Versus Voting Machines

One defect of the paper ballot system which might not at first be considered more than one of inconvenience is, under certain conditions, of considerable danger: it is that of delayed election returns. Even with the most efficient election boards, prompt returns from districts where paper ballots are used are practically an impossibility, as each vote must be counted separately, and in precincts where the election board members are dull or slow, the delay may reach into days.

In some cases this may not be serious beyond inconvenience, but in others it might result in serious altering of the returns. Take, for instance, the Hearst-McClellan mayoralty contest in New York City a few years ago, when it was charged that many frauds were committed in precincts where the returns were delayed, ballots having been marked over by the election officers or fraudulent ballots substituted for valid ones, all being made possible by the fact that the returns could be held back.

When the returns are not made immediately and the ballot-box remains in the custody of the precinct board, an almost unlimited opportunity for fraud exists. With an election board all of one mind or with some of the members careless or sleepy, voted ballots can be remarked or fraudulent ballots substituted almost at will. Unless the members of the precinct election board are known to be absolutely honest, or at least some of them honest and very careful, no dependence whatever can be placed on their election returns if they are delayed.

The voting machine, according to the Automatic Registering Machine Corporation, Jamestown, N. Y., ends once and for all any such danger, as well as the inconvenience of the delay. The minute the last vote has been cast, the entire count is ready for tabulation. Instead of waiting for hours, or in some cases for days, for the result of the election, it can be known complete within an hour in the largest city in the United States, and the danger that always attends delayed returns to a greater or less degree vanishes.

At the close of the polls all the election officers have to do is to unlock and open the rear doors of the Automatic Registering Machine Corporation's machine and copy onto the tally sheets the totals of the votes as shown on the counters. No matter how large the election precinct may be, no matter how many votes have been cast, no matter how many split tickets have been voted, the entire result is ready for tabulation the minute the last vote has been registered.

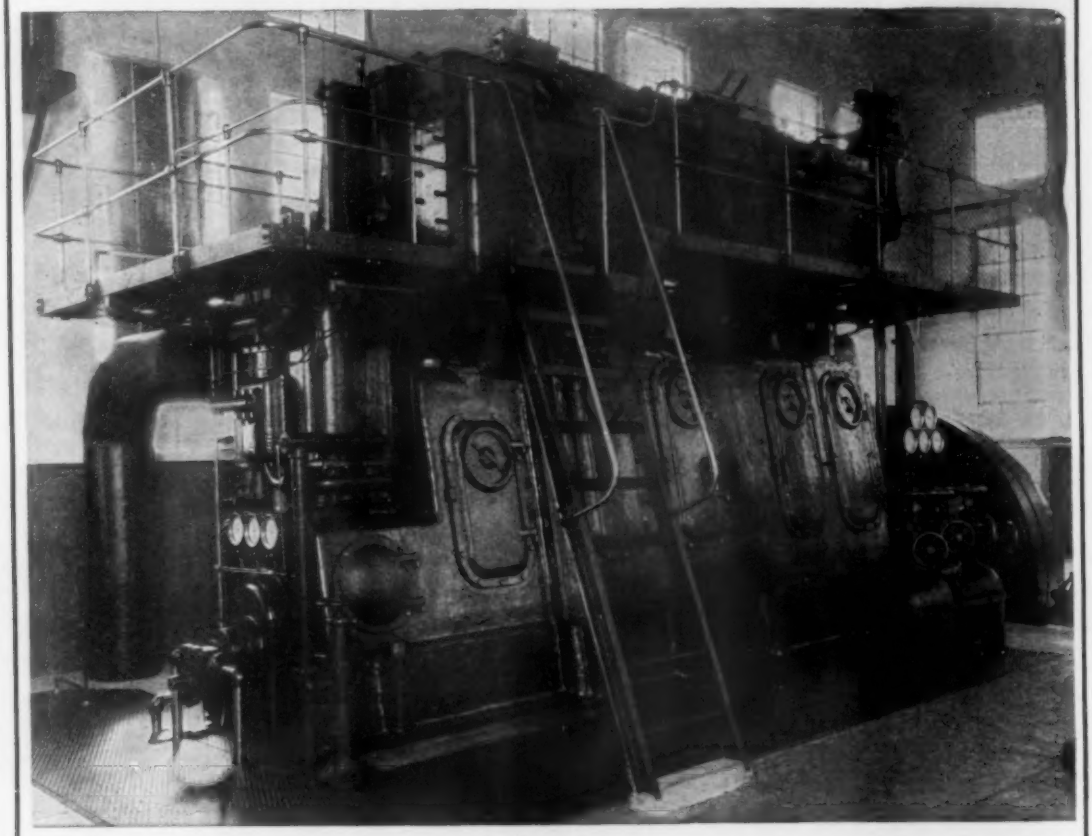
MACHINE THAT SPEEDS UP VOTING

The reason the voting machine can accomplish this is simply because each voter counts his own vote at the time he casts it and adds it to the number already cast. The counting is done on mechanical counters that are very much like the counters on a cash register, and at the close of the polls nothing remains for the election board to do but to read the votes from the dials.

Aldrich Buys Earle Pump Line

The Aldrich Pump Company, Allentown, Pa., has announced that it has purchased all designs, patterns and patents with full manufacturing privileges covering the complete line of Earle centrifugal pumps, heretofore manufactured and sold by the Earle Gear and Machine Company of Philadelphia, Pa. This affords an interesting addition to the well-known line of Aldrich reciprocating pumps.

LOMITA PLANT—WATER & LIGHT DEPT., CITY OF LOS ANGELES, CALIF.



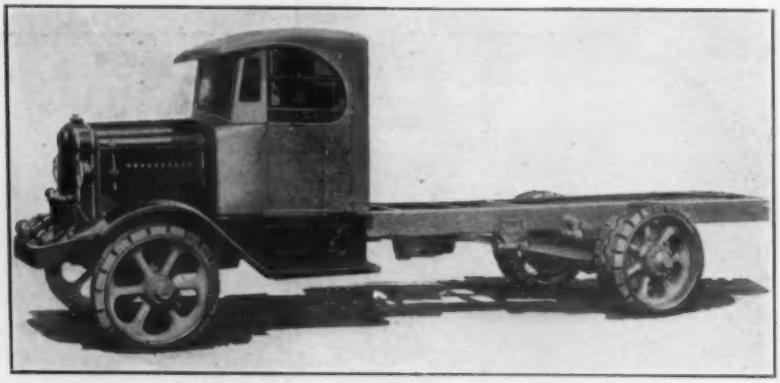
Contains this

750 B.H.P. BUSCH-SULZER DIESEL ENGINE

With the unparalleled increase in population it has been a difficult matter for Los Angeles to meet the demand for water. Numerous wells have been sunk and motor driven pumps installed. The power for driving these pumps is largely supplied by Diesel engine generating equipment located near the wells. Thus they secured dependable power at minimum cost. Your City's power problem can probably be solved the same way.

BUSCH-SULZER BROS.-DIESEL ENGINE CO., ST. LOUIS.

Two Rector St., New York **Rialto Bldg., San Francisco**



THE GMC BIG BRUTE 5-TON TRUCK CHASSIS

Trucks for Extra-Heavy Duty

New heavy-duty trucks designed to adequately care for the increasing hauling problems of municipalities and contractors are announced by the General Motors Truck Company, Pontiac, Mich. The need of every type of service requiring sturdy and powerful trucks was thoroughly studied by competent engineers and their findings were used as the basis of the mechanical and engineering design of the new trucks. Two of the models, the 5-ton and the 3½-ton, have been named "Big Brute" as typifying their strength. The third model, the 2½-ton, has been designed along lines that produce fleetness combined with strength. All three models contain new mechanical and engineering achievements.

Investigation showed that there were four fundamentals in truck construction being demanded by truck users. These are power, accuracy of construction to eliminate need of frequent repairs, design that permits easy and quick servicing, and ease of operation which produces efficiency in operation.

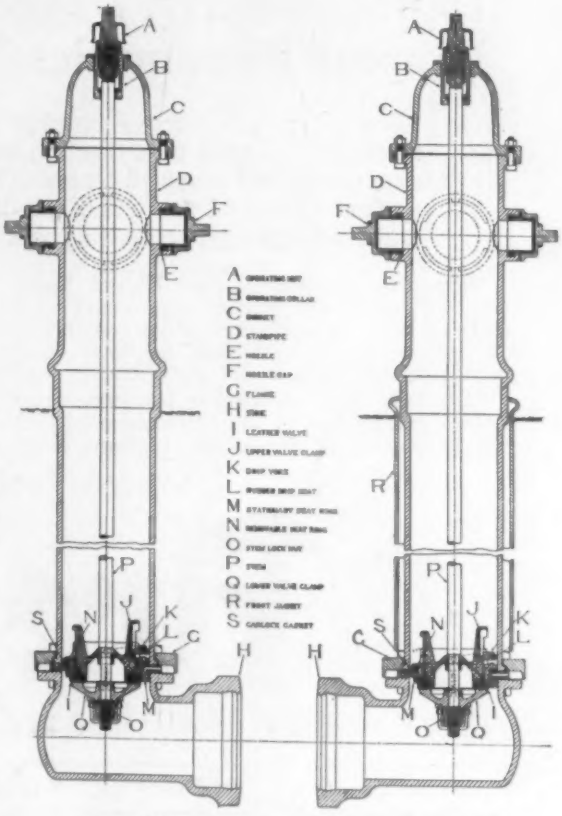
Added power has been supplied in these new GMC trucks, and new manufacturing methods have permitted even finer limits of accuracy. Several new features of design have been added to further increase the ease of performing necessary service operations. These not only reduce up-keep cost, but also shorten the time a truck is withdrawn from work. Truck-driver comfort and ease of operation were points long overlooked in truck design, and it was also not appreciated until recently that comfort adds greatly to the truck's operation. To meet this demand, an all-steel cab was designed by the Fisher Body Corporation in collaboration with General Motors engineers and is used as standard equipment on all heavy-duty trucks. This cab is rattle-proof, has a one-piece full-vision ventilating wind-shield and a comfortable spring seat, and is equipped with sliding doors and sliding curtains providing complete protection against the worst weather.

Among the mechanical improvements are the new metal used in the removable cylinder walls, which gives greater hardness and wearing quality, double honing, which completes the mirror-like finish of the walls, lapped piston pins, new metal alloys for the valves, and a special "coining" finish which improves their wear and reduces noise.

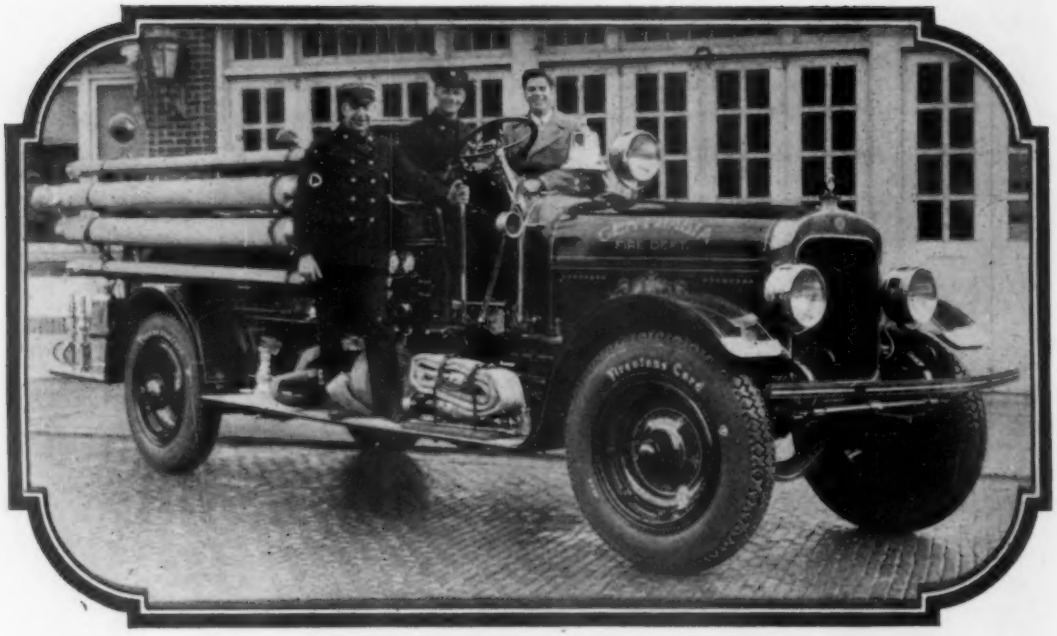
The new models are fully equipped. The electrical equipment includes batteries, generator, head, dash- and tail-lights. Heavy steel bumpers, sheet steel fenders which extend from the bumpers back to the running-board, radiator guard cross-bar, automatic wind-shield wipers, tow-hooks and license-plate holders, as well as the new Fisher built cabs are standard equipment on all models. Oversize tires provide better traction and cover all legislation requirements.

Compression Type Fire-Hydrants

Compression type fire-hydrants are those in which the pressure of water in the line assists in closing the main valve and holding it in place, thus preventing any loss of water, flooding of streets, or injury to property in case the hydrant stand-pipe should become broken. A feature of Michigan Model-O compression fire-hydrants, made by the Michigan Valve & Foundry Com-



THE MODEL O MICHIGAN FIRE-HYDRANT
At left, without frost jacket; and at right, with frost jacket



"Desiring the maximum in Safety and Dependability, I specified Firestone Gum-Dipped Pneumatics."

FRED B. WILCOX, Chief, Fire Dept., Centralia, Wash.

"My order called for Firestone Pneumatics because of their pronounced ability to give traction and resist skidding on both wet and dry, paved and unpaved streets. Their additional sidewall protection against curb and rut wear, and known resistance against moisture, wear and ageing, were also given consideration."

Firestone Heavy-Duty Gum-Dipped Pneumatics grip the road with their powerful tread under all kinds of weather conditions—reducing side sway — holding the road on turns — and responding instantly to the driver's will.

Gum-Dipping, the exclusive Firestone extra process, insulates every fiber of every cord with rubber, minimizing destructive friction—building strength and endurance that gives low tire cost and protects the costly mechanism.

Fire Departments are equipping with Firestone Gum-Dipped Pneumatics in all parts of the country—in all towns and leading centers. Your nearest Firestone dealer will give you proven data of these wonderful tires. See him.

MOST MILES PER DOLLAR

The Mark of Quality

Firestone

HEAVY DUTY PNEUMATICS FOR FIRE APPARATUS

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER - - - Harvey Firestone

pany, Detroit, Mich., is an automatic drain which is opened when the hydrant is closed, so that any water standing in the hydrant is discharged to the outside through several ports which are located in the circular canal. One of the major features of this hydrant is that the valve-rod seats at the top of the hydrant, thus eliminating all stuffing-boxes and packing. This feature, in conjunction with the positive automatic drain, means that the hydrant requires little or no attention. Only from four and one-half to five full turns of the valve stem are required to completely open the main valve. This speeds up delivery of the maximum amount of water in the minimum space of time.

One man can remove all internal parts, including the bronze main valve seat, seat gaskets and drain valve seats through the top of the hydrant stand-pipe without disturbing the stand-pipe and without digging. This is accomplished by simply removing the top of the hydrant and unscrewing the removable bronze seat ring from the stationary bronze seat ring with a spanner wrench. Both seat rings being threaded, one with a male and the other with a female thread, and are made of bronze in order to overcome the effect of corrosion, thus facilitating the removal of the one from the other.

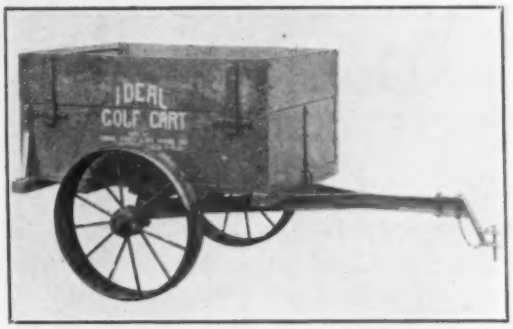
A New Wheel-Type Power Lawn-Mower and a Golf Cart

A new lawn-mower of the wheel type, cutting a swath 25 inches wide, has been developed by the Ideal Power Lawn Mower Company, 400 Kalamazoo Street, Lansing, Mich., and is equipped with a slow-speed 4-cycle air-cooled engine. The ignition is provided by a fly-wheel magneto in which the spark is automatically cut off when the engine reaches a certain set maximum speed. Variable mower speeds for turning, close cutting, etc., are controlled by the throttle to the carburetor.

The operation of the machine is controlled by two clutches of the cone type. Levers are conveniently placed for engaging and disengaging these clutches. One clutch operates the drive-wheel, the other the cutting mechanism. The cutting unit on this mower is of the standard Ideal Bulldog type equipped with Timken roller bearings having a very simple and positive adjustment.

With a capacity of from 4 to 6 acres per day, this Ideal "Twenty-Five" is particularly suitable for small and medium estates where grounds are extensively landscaped with flower-beds, shrubbery, walks, and drives, and for the same reason it is a valuable mower for use in parks and on the lawns of cemeteries, schools, and public buildings.

THE IDEAL "25" IN ACTION



A CART THAT DOES NOT HARM THE TURF

The Lansing Company, Lansing, Mich., is manufacturing for the Ideal Power Lawn Mower Company, Lansing, Mich., a golf cart which holds 30 cubic feet of dirt, has wide wheels, is built strong, and can carry a 1½-ton load without injury to the grass. The box shown in the illustration is 24 inches deep, 44 inches wide, and 52 inches long. This wagon is built for the heavy work on golf courses and city parks and has proved a boon to superintendents. The box is of hardwood painted green with all the corners reinforced with iron strips. All of the joints are tight and dust-proof, and every part of the box is securely bolted. An important feature is the hinged lower dump-gate which swings upward and makes unloading easy and quick. When the box is returned to position, the gate is automatically locked.

Autocar Reorganizes

Reorganization of the Autocar Company, of Ardmore, Pa., is now under way. It will include an issue of non-voting stock with provisions in the by-laws regarding the issue which will meet the requirements of the New York Stock Exchange. If the plans materialize, it will be the first attempt of any corporation to issue non-voting stock since agitation against it started several months ago.

It is expected that the contemplated sale of securities will realize sufficient funds to pay off the funded debts and provide additional working capital to take care of the company's increasing volume of business. The gross business reported during 1925 aggregated $18,000,000 as against $3,900,000 in 1915.

Officers of Ruggles Motor Truck Company

The Ruggles Motor Truck Company, Saginaw, Mich., has announced the election of J. W. Fordney, formerly Chairman of the Ways and Means Committee of the United States Congress, as President; R. J. Goldie, First Vice-President and General Manager; H. R. Wickes, Second Vice-President; Charles T. Kerry, Treasurer; E. L. Smith, Secretary.

Heavy trucks on air?

Yes . . . with BUDD-MICHELIN Dual Wheels

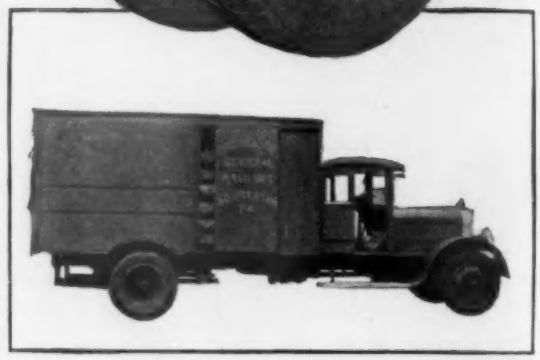
BUDD-MICHELIN Dual Wheels make it possible for trucks of any reasonable size and loads of any reasonable weight to ride on *regular size pneumatics* and get tire mileage equal to that of passenger cars.

This is the most important factor in motor transportation today. It is changing the whole conception of a truck's usefulness and scope.

Now the heavy truck can bowl along *safely* at passenger-car speed without racking itself to pieces . . . without breaking up the cargo.

Budd-Michelin Dual Wheels have shown truck owners how to increase their delivery radius, cut down the number of trucks required to cover their territory, lengthen the life of their trucks and reduce maintenance costs.

Here's additional proof: 30,000 heavy buses on Budd-Michelin Dual Wheels average 15,000 to 20,000 miles per set of tires. Trucks which have been equipped with Duals are duplicating this mileage.



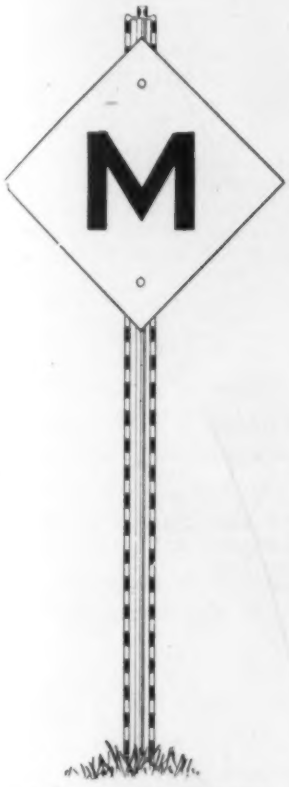
They're here—and you can get them on any make or type of truck, simply by specifying them in your order. Your present trucks can be converted, too. Write us for further information—or talk to any bus operator or truck dealer.

BUDD
WHEEL COMPANY
Philadelphia

The Budd-Michelin equipment—two Budd-Michelin single wheels in front, two Budd-Michelin Dual Wheels in the rear (pairs of single wheels acting together as units). All wheels completely interchangeable either as units or as halves of Duals. One spare.

Steel Posts for Highway Signs

Steel posts that are made from a rolled section, representing an entirely new principle in post construction, have been developed by the American Steel & Wire Company, 208 South La Salle Street, Chicago, Ill. These posts are built like a railroad rail, offering greater strength in all directions. The posts are finished with a heavy coat of special steel paint with unusually high preservative qualities. The paint is baked under a high temperature and the post is also furnished galvanized.



A HIGHWAY SIGN-POST

To drive posts, an ordinary steel sledge may be used or the special post driver developed by the company. With the driver one man can easily set a number of posts a day. All that is necessary is to raise the driver and let it drop. A paint - protecting sleeve is set on the top of the post with the top of the sleeve about one inch below the top of the post, so that the driver will hit the top of the post. The driver can be used without the sleeve if desired.

The anchor plates—a part of this post — are 3½ x 9-inch plates of heavy steel firmly riveted to the stem of the post. By fastening them lengthwise, the fulcrum is spread over its entire length instead of being conconcentrated at one point as it is when the anchor plate is fastened crossways. This method of attaching anchor plates gives greater strength and stability in the ground and retains all of the facing surface of the face of the tee as the plate is fastened to the stem, thus avoiding duplication of surface area. In driving, the edge of the first plate on entering the ground cuts a slot. The second plate follows, and as it is not parallel to No. 1 it must cut its own slot, and in doing so it closes the slot cut by the first plate. The third plate in turn reopens the slot made by the first plate and closes the second slot.

Celite Moves San Francisco Office

The Celite Products Company, 1320 South Hope Street, Los Angeles, Calif., has announced the removal of its San Francisco office from the Monadnock Building to 140 Spear Street, San Francisco, in order to provide larger quarters and better operating facilities.

DETAILS OF STEEL HIGHWAY SIGN POST

At left.—Complete post with anchor

Above.—The anchor enlarged

Westinghouse Lighting Units and Standards for Davis Islands, Tampa

What is said to be the largest complete ornamental street-lighting contract that has ever been placed in the United States for a real estate development, was recently awarded in the Davis Islands, Tampa, Fla., to the Westinghouse Electric & Manufacturing Company, through the Pierce Electric Company, of Tampa. The Davis Islands

ATTRACTIVE STREET-LIGHTING STANDARD ON DAVIS ISLANDS

Single track streets make single track towns

SNOW STORMS mean "single track" streets, with only a narrow lane plowed along their centers.

And no one cares to drive into the congestion that such streets produce.

So, flivvers hibernate in garages and people don't use the streets any more than they have to.

As a result, shoppers dwindle in number—business slows up—and the whole town drops back to a "single track" basis.

But it isn't necessary to have your town running "single track" all winter.

Barber-Greene Snow Loaders keep your streets snow free all winter long.

A single Barber-Greene is 100 to 200 snow shovelers wrapped up into an efficient tireless machine, that works night and day until the job is finished.

And a Barber-Greene usually saves its original price on the handling of the first real snow.

For you, who are tired of "single track" streets in winter, we have prepared a new booklet. It shows in pictures and text how a number of cities, many the same size as yours, are licking snow with Barber-Greenes.

Copies will be sent to you upon request. Just ask for *Modern Snow Removal.*

BARBER-GREENE COMPANY—*Representatives in 50 Cities*—515 W. Park Ave., Aurora, Illinois

BARBER GREENE
SNOW LOADERS

are well known through the publicity they have received in the press. They have an area of 875 acres and are located in Tampa Bay about a half-mile from the City Hall of Tampa.

Fifteen hundred complete lighting units with Westinghouse Hollowspun concrete standards of Sheridan design will be used throughout the islands. Topping these lighting standards will be Westinghouse octagonal lighting units with bronze or aluminum lanterns. For the residential section, these lanterns will be all-metal to confine the light to the ground, while along Davis and Biscayne Avenues glass panels will be used in the canopy. The standards will be 17 feet high along the boulevards and 14 feet in other places. In the business section, the standards will be so spaced as to produce a white way effect, while in the residential district they will be spaced to give the proper distribution of light. The larger units will be illuminated by Mazda street series lamps of 6,000-lumen capacity. The units in the residential section will contain lamps of 4,000-lumen output.

These 1,500 ornamental lighting units will require more than 300,000 feet of cable, weighing approximately 180 tons; ten solid railway cars will be required to transport the cable alone. The cable will be laid at a depth of 12 inches along the curbway and will be put down at the same time as the pavement, to facilitate construction. The standards complete will average 800 pounds each, or 600 tons in all.

A Street Excavator and Loader

A new end-loading elevating grader which loads material into a motor truck that pulls the machine has been developed by the Western Wheeled Scraper Company, Aurora, Ill., and is known as the Western Street Excavator. The excavator is narrower than the truck that pulls it, making it possible for the entire assembly to operate in a street that is 14 feet from curb to curb. The machine is steered independently of the truck and therefore can swing around a manhole or other obstruction in the street or alley. It has been necessary heretofore to excavate narrow streets by hand or with steam shovels and skimmers, a slow and expensive operation in cramped quarters.

In the Western Street Excavator some of the principles of the Western elevating grader are used. The excavator is composed primarily of a heavy built-up steel structural framework mounted on rubber-tired wheels with Timken roller bearings with a heavy plow on the left side and a short transverse elevator underneath the framework. The plow turns the excavated material onto the elevator, which in turn deposits it in the hopper, from which it is fed onto a longitudinal trough-shaped elevator extending forward from the hopper beyond the front end of the machine. The elevators are operated by a gasoline motor.

The axles of the excavator are of the automobile type, with Timken bearings and standard 34 x 5-inch rubber tires. The front axle is steerable. All bearings used on the machine are of the roller or ball anti-friction type.

As the truck moves forward, pulling the machine, the material from the street is deposited in the truck body. At the upper end of the elevator is a specially designed spout or deflector controlled by the operator on the platform of the excavator, who by this means distributes the material evenly in the truck body, thus insuring a full and uniform load.

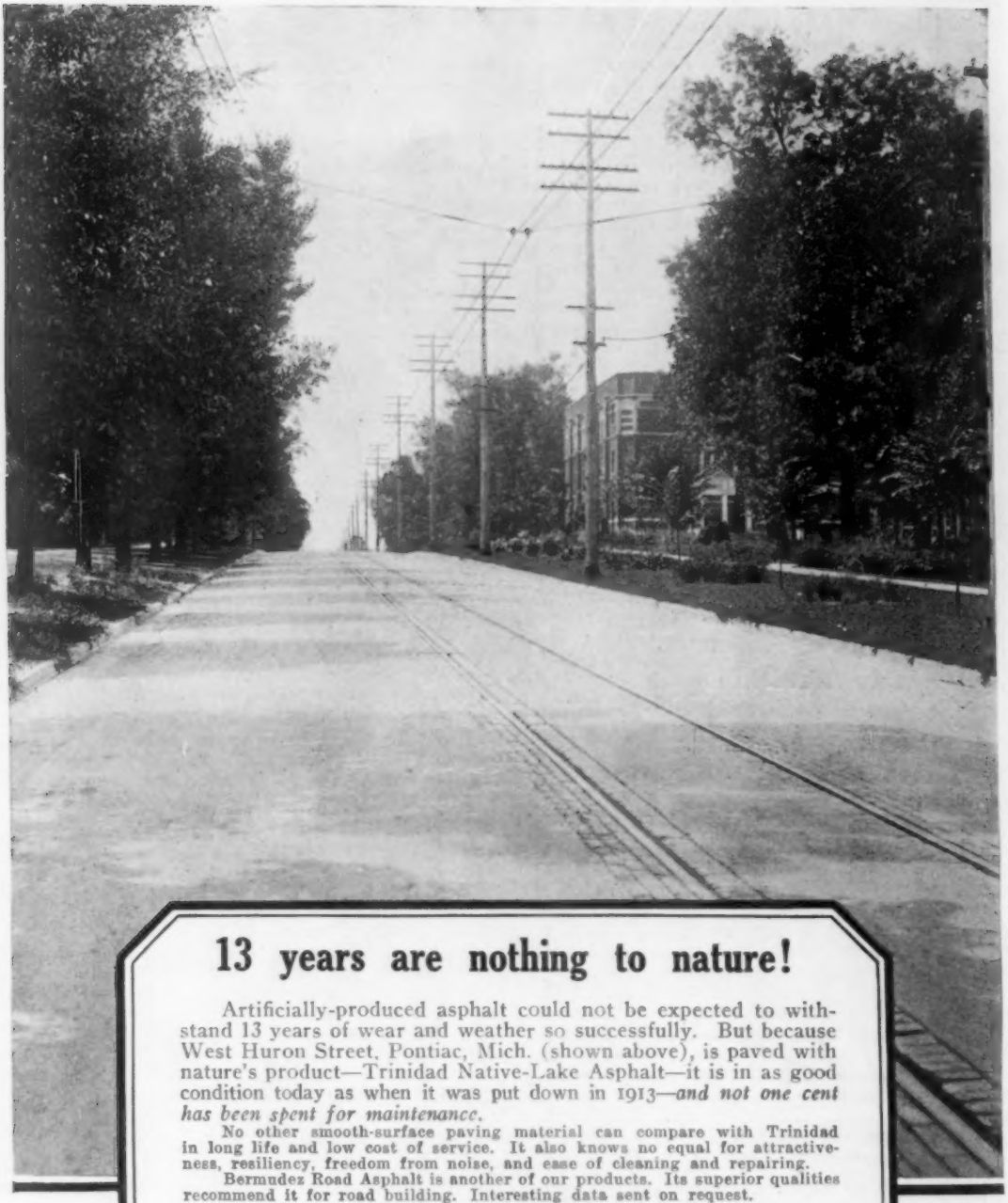
There is also provided a specially designed automatic coupling which may be instantly released by the operator of the machine by means of a lever conveniently at hand. When the truck has taken on its full load, a movement of the lever releases the truck, which then proceeds to the dump at full speed, while another waiting truck backs up to the machine and is automatically coupled to it. The outfit then moves forward and the empty truck is loaded as before.

The manufacturers state that it takes but a few minutes for an empty truck to couple onto the excavator and that 4 to 6 yards can be loaded into the truck in from 2 to 3 minutes. As the truck proceeds to the dump at the rate of 15 or more miles per hour, the operation of loading, hauling, and dumping the material is quite rapid. It is claimed that this new machine will load from 15 to 20 trucks or 60 to 100 cubic yards per hour, according to working conditions and the expertness with which the outfit is handled.

A Prize Contest for Firemen

A $500 Firemen's Relief Contest with two $250 prizes has been announced by the Gamewell Company, Newton Upper Falls, Mass. One $250 prize in Class 1 is to be awarded for the best news clipping or official report of a fire where the use of fire-alarm telegraph system saved life or property. The second $250 prize, which will be in Class 2, is to be awarded for the best news clipping or official report of a fire where a delayed alarm could have been prevented by the prompt use of the fire-alarm telegraph system. These prizes are to be paid to the Firemen's Relief Association in the city where the incidents occur. The contest closes September 20, 1926, when the winners will be selected by a committee chosen by the Gamewell Company.

THE NEW WESTERN EXCAVATOR JUST RELEASED FROM TRUCK AFTER LOADING IT FULL



13 years are nothing to nature!

Artificially-produced asphalt could not be expected to withstand 13 years of wear and weather so successfully. But because West Huron Street, Pontiac, Mich. (shown above), is paved with nature's product—Trinidad Native-Lake Asphalt—it is in as good condition today as when it was put down in 1913—*and not one cent has been spent for maintenance.*

No other smooth-surface paving material can compare with Trinidad in long life and low cost of service. It also knows no equal for attractiveness, resiliency, freedom from noise, and ease of cleaning and repairing.

Bermudez Road Asphalt is another of our products. Its superior qualities recommend it for road building. Interesting data sent on request.

The Barber Asphalt Company

Philadelphia

New York Chicago Pittsburgh St. Louis Kansas City San Francisco

TRINIDAD LAKE ASPHALT

GROUP OF STREET-LIGHTING EXPERTS INTERESTED IN THE SANTIAGO, CHILE, STREET-LIGHTING PROJECT

Left to right.—Dudley M. Diggs, Merchandising Department, International General Electric Company, Schenectady, N. Y.; Mr. Bennett, Engineer of Compania Chilena de Electricidad Lighting, Santiago Chile; Mr. Worswick, Managing Director of Compania Chilena de Electricidad Lighting, headquarters, London, England; W. A. Porterfield, Vice-President, Union Metal Manufacturing Company, Canton, Ohio; C. G. Beckwith, Superintendent, Municipal Lighting Plant, Cleveland, Ohio; Mr. Skiff, The National Lamp Works, Cleveland, Ohio; Mr. Bernard, Carr Brothers Company, New York City; Senor Raphael Edwards, Consulting Engineer for city of Santiago, Chile. O. F. Haas, Illuminating Engineer, National Lamp Works, Cleveland, Ohio; Mr. Alexander, Street-Lighting Engineer, International General Electric Company, Schenectady, N. Y. We are informed by Mr. Porterfield that the dog's name is unknown

Monarch Tractors Moves to Springfield, Ill.

Monarch Tractors Incorporated, at Watertown, Wis., has completed its plans for removing its business to Springfield, Ill. A new Illinois corporation has been formed with a capital stock of $600,000, and an excellent factory site has been secured in Springfield which will enable the production of Monarch tractors to be very largely increased.

The new plant at Springfield is of modern brick and steel construction with some 80,000 square feet of manufacturing space all on one floor, and with some 4 acres of additional ground to permit of future expansion. Alterations are now being made in the plant, and it is expected that machinery and equipment from Watertown will be moved and the new plant will be occupied early in April. The Watertown lands and buildings will be utilized by another manufacturer.

The name of the new Illinois firm is "Monarch Tractors Corporation," and the officers are as follows: R. W. Gotshall, President; H. B. Baker, Vice-President; R. C. Lamphier, Vice-President; Owsley Brown, Secretary and Treasurer. Messrs. Gotshall and Baker joined the Monarch company several months ago as respectively in charge of production and of sales, and at Springfield they will have the entire active management of the business. Prior to joining the Monarch organization, Mr. Gotshall, for fifteen years, was connected with The Holt Manufacturing Company, at Peoria, Ill., and for the past six years was assistant general manager of the Peoria plant. Mr. Baker had been General Sales Manager of The Holt Manufacturing Company, at Peoria, for the past twelve years.

Associated with Mr. Gotshall and Mr. Baker in the Monarch organization, as heads of departments of engineering, production, accounting, etc., are men who were formerly associated with them in similar capacities at The Holt Manufacturing plant, and the Monarch organization is composed of men who have had long experience in the development of the track laying tractor industry, both in the factory and in the field.

Bay City to Have Warehouse at Roselle, N. J.

The Bay City Dredge Works, Bay City, Mich., has purchased property at Roselle, N. J., and is now building a steel warehouse and service station. A siding is to be constructed to the B. & O. railroad, whose tracks pass the property. This warehouse will be used for the storage of new Bay City excavators, Model 16-B and Model 4, and a complete line of parts for immediate delivery. The warehouse will be under the direction of the eastern office of the Bay City Dredge Works, which is at 302 Broadway, New York, Eugene P. Reading, Manager in charge.

This company also has under construction at its Bay City plant an additional 5,000 feet of floor space which will be used for erection and assembly of its two excavators. This is the second unit of this size to be put up within two years.

TRAFFIC CONTROL

——*at the least possible cost!*

Time was when one officer handled the traffic at any busy corner. Today, unless mechanical control is employed, it takes from two to four men to handle the same corner.

In our 12 types of traffic control devices there is something that will meet your particular need. And you will agree with us that it is the finest and most diversified line in the market. Automatics, both overhead and standard type, intersection signals, beacons, boulevard stops—you will find them all here. And if you have an engineering problem we gladly offer our services in case we can be of help.

Illustration shows our 6 DeLuxe Automatic. Entirely covered with copper. Sturdy and reliable control device.

Illustration shows assembly of sign, holder and standard. Also made in arm suspension type for clamping to trolley or lamp post.

Our Signals Embrace
Illumination — Visibility
Stability—Durability
Economy—Art.

In all fairness to your citizens and to strangers in your city, parking rules and restrictions should be posted where they may easily be read.

Our parking and zoning signs will do this for you at minimum cost. Dignified embossed signs in attractive enameled colors, together with our patented holders, enable you to spread your message. With our equipment there can be no excuse on the part of the driver.

The line includes parking and zoning equipment, directional signs, one-way street indicators, danger signs—everything to meet the needs of present traffic conditions. And the prices are so low that no municipality, large or small, can afford to build its own equipment.

New Catalog Ready March 1—Write for Your Copy.

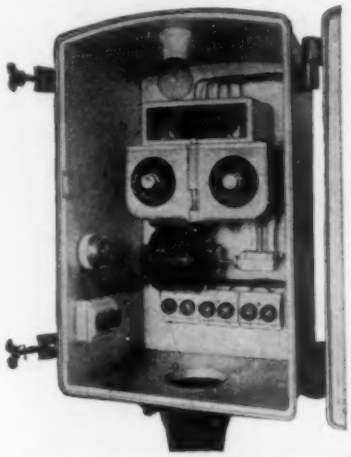
ROCHESTER STREET SIGNAL CO.

Designers and Builders of Traffic Control Devices

400 Ward Bldg. **Rochester, N. Y.**

A Selective Control for Traffic Signals

A new motor-driven, direct-drive, selective control for traffic signals, which functions through the operation of a gear mechanism running in an oil bath and operating clapper-type switches in a dust-proof housing, has been developed and placed on the market by the Essco Manufacturing Company, Peoria, Ill. The mechanism consists of two cut-steel hardened timing gears which are alternately driven from a constant speed shaft. One of these two timing gears represents the time or period to be allowed traffic in one direction, and the other represents traffic in the cross-direction. Each timing gear is controlled from outside the housing by means of a hand-set timing indicator which moves over a definitely calibrated scale marked in seconds, reading from 10 to 150 seconds. The setting of these indicators at any definite scale causes the operation of the timing gear at the same time interval. These indicators can be set by simply loosening thumb-screws allowing for changing the timing on one street of an intersection, without in any way interfering with the timing on the other street of the same intersection.



INTERIOR OF THE NEW ESSCO TRAFFIC-CONTROL SWITCH-BOX

Notwithstanding the flexible arrangement provided for changing the timing for main traffic or cross-traffic, the caution period remains at a constant timing. This caution period is predetermined and arranged to operate at this predetermined period, when the controlling equipment is constructed. The caution or change shows only on the green signal, thus preventing drivers from beating the red signal, that is, from starting before the red has been dimmed.

This mechanism works in an enclosed aluminum casing and runs in an oil bath. An oil gage is provided, and the only maintenance necessary is the addition of oil from time to time to keep the oil level approximately at the height indicated. The top of this housing makes an oil-tight fit with the housing proper and in addition supports the switching mechanism.

The switches are of combination bakelite and heavy brass stampings, furnished with tungsten contacts and braided copper pigtails so designed as to eliminate practically all wear on any part. Mercury contacts can be provided, if desired. The panels supporting contacts are of bakelite rigidly supported and liberally proportioned. Connections are made through a terminal strip above, which is of bakelite with recessed binding screws. The whole of the electrical assembly is protected by an upper housing of aluminum furnished with a felt gasket and a plate glass front permitting an examination of the switches or contacts at any time and yet preventing the settling of dust on them, or accidental touching.

The whole mechanism is driven by a 1/20-horsepower motor provided with packed wool waste at either end and guaranteed by the manufacturer to run one year without oiling. This is direct-connected to a worm reduction gearing contained in a brass housing, the shaft being provided with a packing nut to prevent the leaking out of oil or grease. The whole control is mounted in the cabinet by means of three screws giving a 3-point support. The control cabinet is of cast iron, provided with water-tight gaskets beneath the cabinet and the door. Below the controller are mounted the fused cut-outs for signals, also the transfer switch for hand control. The hand control may be mounted below the cabinet or can be mounted so as to be operated through one side of the control cabinet housing, if desired.

Allis-Chalmers Foreign Business

The Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has announced that its business in continental Europe will be handled through an organization recently incorporated as Allis-Chalmers (France) with headquarters at 3 Rue Taitbout, Paris. H. I. Keen, who has been manager of European sales through the company's district office in Paris, will be the Managing Director of the new organization. The company has also maintained for many years an office in London at 728 Salisbury House, London Wall, E. C. 2.

Barber to Manufacture Non-Corrosive Alloy

The Barber Asphalt Company, Philadelphia, Pa., has announced that it has taken over the exclusive rights to manufacture "Aterite," a non-corrosive, acid-resisting metallic alloy formerly made by the Aterite Company, Inc., John and William Streets, New York. The Barber Asphalt Company is now in a position to furnish Aterite valves, fittings, and special castings to those requiring such a metal. These products will be manufactured at the Iroquois plant of the company, located in Buffalo, N. Y.

Aterite, although exceedingly ductile, has great strength and weighs 536 pounds per cubic foot or approximately 19 per cent more than cast iron. A microscopic examination of the alloy shows it to be dense and homogeneous, with a close grain of smooth, uniform texture.

This alloy starts to fuse at 1541° Centigrade (2805° Fahrenheit) while its pouring temperature is 1690° Centigrade (3075° Fahrenheit). Aterite can be cast in any of the usual forms used in iron, brass, or other special alloys and can be cast in forms having thin walls. The castings are remarkably free from blow-holes, cavities and other surface or interior defects.

Aterite possesses excellent machining and working qualities, it cuts with remarkable smoothness, machines very easily, and when polished takes on a silver finish. This property suggests its use for many articles which require a nickel plating.

Aterite is a patented product. It has found wide acceptance in the process industries and is recommended for use with many acids and bases.

ALWAYS SEEN

The Horni Multi-Angle Stop-and-Go Traffic Signals have each section so adjustable as to face exactly in the direction from which the traffic is approaching. With a signal unit of this type, it is possible to control very efficiently intersections, the approaches to which meet at other than right angles. The control is either manual or automatic.

Aluminum, brass and bronze are the only metals used in the construction of this signal. Consequently its ability to stand up during a long term of years cannot be doubted.

CATALOG ON REQUEST

HORNI SIGNAL MFG. CORP.
NEWARK, NEW JERSEY

A HARDIE MOGUL SPRAYER IN ACTION

A Big, Powerful Motor Sprayer

The Hardie Master Mogul 25 is a powerful sprayer for city use developed by the Hardie Manufacturing Company, Hudson, Mich., and Portland, Ore.

The pump for this unit is a heavy-duty triplex pump with a four-bearing crank-shaft, that is, bearings between the plungers, giving the pump a rigidity not found in other sprayers. This unit is capable of discharging 25 gallons of spraying mixture per minute at 500 pounds pressure. It is driven by the Hardie-Ford engine, which is the standard Ford engine mounted on a base especially designed by the Hardie Manufacturing Company. The engine is equipped with special oiling features and circulating water pump. This power-plant is mounted in front, and the 300-gallon tank is carried on large 52-inch wheels with 6-inch tires on the rear. The truck is a reliable Autoplex truck for either horse or tractor pull.

The sprayer is built throughout to give efficient operation and to protect the pump from damage.

The Hardie plunger tubes or cylinders are made of semi-steel castings bolted to the base with four heavy cap screws. The tubes are highly polished and heavily lined on the inside with porcelain to prevent corrosion from the solutions used.

New Centrifugal Cast Iron Pipe

The new plant being erected by the American Cast Iron Pipe Company, Birmingham, Ala., for the manufacture of centrifugal cast iron pipe in refractory molds, it now appears, will be ready for operation on a commercial basis by the middle of May. The plant will manufacture pipe in 16-foot lengths and in diameters of 4, 6, 8, 10 and 12 inches. The plant will be capable of operation 24 hours per day with a potential capacity equivalent to two 6-inch, 16-foot pipe per minute.

"Acipco Mono-cast Pipe" is the trade name adopted by the American Cast Iron Pipe Company for this product. "Mono-cast" means a pipe made as a unit—an integral casting every part of which is formed at the same moment by centrifugal force. This new centrifugal pipe will be bell and spigot with bead on the spigot end, and will be made under specifications providing for seven standard weight, i.e., Classes A, B, C, and D, weights of the American Water Works Association, standard weights of the American Gas Association, and two lighter weights, which will be respectively approximately 17.5 per cent and 25 per cent lighter than standard Class B American Water Works weights.

Exhaustive tests show this new centrifugal pipe to be a superior product. It is the same reliable grey iron structure of the standard cast iron pipe that for many years has been made in the casting pits of modern pipe foundries. Being cast centrifugally, however, it acquires certain characteristics that increase its serviceability to an extent not obtainable with pipe made in the usual way in vertical or horizontal molds.

The development of this process has been under way at the plant of the American Cast Iron Pipe Company for the past three years. Since that time approximately 10,000 tons of this pipe have been made and placed in service in all sections of the country.

A Safe Power Mower for Steep Work

The "City Model" Moto-Mower, which is a lighter, lower-priced unit that will run up and down terraces, and climb a 25 per cent grade, is made by the Moto-Mower Company, Detroit, Mich. It may be guided close enough to trees, hedges, and flower-beds to eliminate hand trimming. It cuts more evenly than the hand mower, leaving an even, perfect lawn. Gasoline and maintenance costs are negligible. Occasional lubricating at but four points keeps the mechanism in order, and simplicity of construction renders it practically fool-proof.

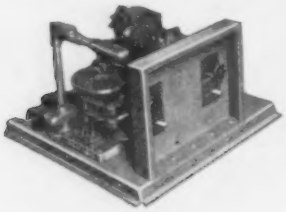
The Moto-Mower is simple to operate, as the steering is done by turning two rubber handle-grips which cause it to start, stop, or turn in any direction under its own power. It is equipped with

AN EFFECTIVE GRASS CUTTER

a throttle control which is conveniently placed on the handle, allowing the operator to run the mower at any speed and which in no way affects the smooth, even cutting qualities of the unit.

The cutting or revolving blade is run on a self-adjusting Timken bearing, so that these revolving cutter bearings scarcely ever need any attention. This feature makes it very simple to keep the cutting part in proper adjustment and prevents chatter and gives the assurance of a better cutting unit. More grass cutting can be accomplished in a day because the operator is relieved of the many annoyances ordinarily encountered in other grass-cutting units.

TYPE A
Automatic Variable Timing Switch
For Interlocked Electric Traffic Signal Systems



Type A
Automatic Variable Timing Switch
With Housing Removed

Accurate, Flexible, and Easily Adjusted to Changing Traffic Conditions

North-South and East-West adjustments independent of each other. Either may be changed without changing the other.

15 seconds to 115 seconds North-South and East-West. Constant amber interval.

Change in timing instantaneous—without use of tools and without shutting down the timing switch.

Two separate time scales graduated in seconds one for North-South and one for East-West.

Can be furnished for either alternating or direct current.

Additional information will be furnished upon request.

Type A
Automatic Variable Timing Switch

CROUSE-HINDS COMPANY

ESTABLISHED 1897

SYRACUSE, N. Y., U. S. A

SALES OFFICES

NEW YORK
PHILADELPHIA DETROIT
CINCINNATI

BOSTON

CHICAGO
ST. LOUIS MINNEAPOLIS
SAN FRANCISCO

CH 217